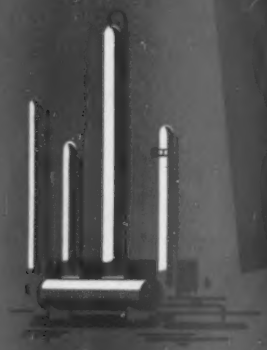
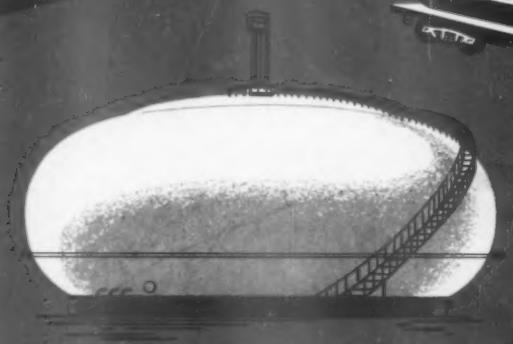
the OIL AND GAS JOURNAL

A B C's of SUPERVISION
. . . begins on page 121

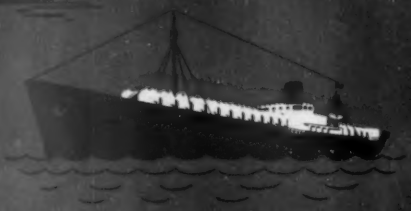
Service



NATURAL GASOLINE
PROPANE
ISO-BUTANE
BUTANE
ISO-PENTANE



NORMAL PENTANE
HEXANE
HEPTANE
HEAVY NAPHTHA
STA-VOL-ENE



WARREN
PETROLEUM CORPORATION

PRICE 50 CENTS TABLE OF CONTENTS ON PAGE 1 FEBRUARY 16, 1953

This is fine

but these
make it
better

all together
they make
KONESHOT
the "plus value"
shaped charge
perforating

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Tomorrow's Tools - Today!

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THE OIL AND GAS
JOURNAL
Vol. 51, No. 41

CONTENTS FOR FEBRUARY 16, 1953

NEXT WEEK

- Sea-Going Tank-Battery Barge Withstands Roughest Weather.
- How to Make Phenol—A Petrochemical Report.
- Logging Dry Shot Holes.
- Cat Cracker Gas Plant Expanded to Accommodate New Unit.
- Engine Cooling by Ebullition.
- Exploration Activity on the Southeastern States.
- Other articles and Regular Features.

REGULAR DEPARTMENTS

They Say	78
Calendar of Events	82
Journally Speaking	87
Editorial	89
This Week	91
Watching Washington	102
International News	105
Personals	112
Deaths in the Industry	114
On the Job	160
Engineering Reference	169
Engineering Fundamentals	171
Refiner's Notebook	173
Corrosion Control	175
Modern Drilling	177
Heat Transfer	178
Equipment Digest	181
Refining News	187
Pipe-Line News	189
Natural-Gas News	193
Drilling Contractors	194
Running High	194
Active Rotary Rigs	196
Exploration Statistics	218
Production Statistics	219
Refining Statistics	220
Market Statistics	221
Equipment Men in News	223
Classified Advertising	225
Advertisers' Index	229

EXPLORATION—DEVELOPMENT

Southernmost Province Being Tested	199
Highlights of Week	199
Reports by Areas	200

NEWS FEATURES

Study Indicates No General Oil-Price Increase When Controls End	92
Phillips to Drill 12 Wildcats on Million-Acre Alaskan Block	94
Boom in Ammonia-Plant Construction Highlighted by Spencer Plant	95
A.P.I. Endorses NPC's Outline of a National Oil Policy	98
Factors Affecting Lube Yield, Throughput Outlined Before W.P.R.A.	98
PAD Allocates 289,000 Tons of Line Pipe for Second Quarter	100
Tidelands Hearings Open in What May Be Last Fight Over Issue	101
Bill Introduced to Give States Mineral Rights on Public Lands	102
Monterey Buys Wilshire Properties, May Acquire Company Control	104
Manning Hints Alberta Seriously Considering Major Exports of Gas	104
Survey Shows 636 Rigs Running in Non-Communist Areas Abroad	105
Jersey Standard Cuts Price of Middle East Crude by 12 Cents	106
Two More Small Italian Tankers to Load Oil From Abadan	108
Promising Shows Found in Wildcat in Australia	108
Extensive Damage to Two New British Refineries Caused by Flood	109
Third Well in Colombia's Totumal Area Brought in as 400-Bbl. Producer	110

ENGINEERING-OPERATING FEATURES

Rig Skidded in 15 Minutes ... 116
Innovation in derrick construction minimizes operating vibrations; separate draw-works substructure expedites skidding. By Joseph A. Kornfeld.

Sulfur-Recovery Plant at Keystone Has Capacity of 15 Tons Daily ... 118
Sid Richardson's installation is latest addition to fast-growing list in Permian basin area. By D. H. Huff and R. A. Graff.

Texas Railroad Commission Regulations: Plants ... 120
This is the final article in series describing how oil business is regulated in the Lone Star State. By Roy F. Carlson.

A B C's of Supervision ... 121
Special section devoted to a careful study of the principles of directing the efforts of other people.

Underground Gas-Storage Capacity Nearly Trillion Cubic Feet ... 135
Total storage capacity in United States has nearly doubled that in operation at the end of 1949. By Joseph A. Kornfeld.

Practice Unit Aids Operator Training Program at Monsanto ... 144
Unit is used to train new personnel in various phases of process operation. By F. Lawrence Resen.

Annual Diesel-Fuel Survey—1952 ... 154
Postwar Development of Italian Natural-Gas Pipe Lines ... 159
On the Job . . . Picture Report ... 160
On the Job . . . In the Plants ... 163
Engineering Reference Section ... 169-178
Oil and Gas Equipment Digest ... 181

PENBERTHY Liquid Level Gages

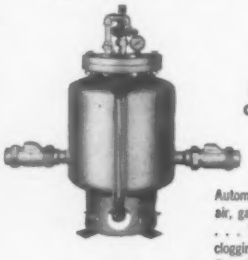
YOU CAN *Remove and Replace Without Shutdown*

Union connections between the gage and the valves permit removal of gage for repairs without shutting down the equipment. Just close the valves, uncouple the unions and remove the gage. The convenience of this is obvious. When glasses have to be replaced or repairs made, it is not necessary to work in an awkward position or to shut down. Another advantage: a gage needing repairs can be replaced immediately by a spare and the repairs made at leisure. There are many other reasons for the superiority of Penberthy Liquid Level Gages; ask for Catalog 35.

OTHER PENBERTHY PRODUCTS

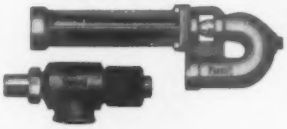
PENBERTHY TRANSPARENT GAGE

Used to observe color and density of liquids under high pressures and/or temperatures. Exceptionally sturdy construction—liquid chamber machined from solid block of metal. Ask for Catalog 35.



PENBERTHY CYCLING JET PUMPS

Automatically operated by air, gas or steam pressure . . . Will pump without clogging any liquid that will flow through pipes. Ask for Bulletin 5030.



PENBERTHY EJECTORS

A simple jet pump operated by air, water or steam. Needs no lubrication . . . will not get out of order. Made in wide variety of materials and special units developed to meet unusual conditions. Ask for Bulletin 512.

PENBERTHY EXPLOSION-PROOF SUMP PUMPS

Motor and switch totally enclosed. Underwriter approved for Class 1, Group D, and Class 2, Groups E, F and G hazardous location. Made of copper and bronze throughout. Ask for Bulletin 4929.

4672

PENBERTHY INJECTOR COMPANY

DIVISION OF THE BUFFALO-ECLIPSE CORPORATION

DETROIT 2, MICHIGAN

Established 1886 — *Canadian Plant, Windsor, Ontario*

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Where failures meant shutdowns they changed to grommet belts

B. F. Goodrich grommet V belts last 20 to 50% longer

Crushing rock puts terrific shock loads on the V belts that drive the crusher. When the drive stops because of premature belt failure, the whole operation shuts down, deliveries are delayed. The stone company wanted reliability—and got it—when a set of B. F. Goodrich grommet V belts was installed. In spite of the shaking, jolting action, the grommet V belts on this crusher have already given two years of trouble-free service, and are still in excellent condition. Here's why B. F. Goodrich grommet V belts outlast and outperform ordinary belts.

No cord ends

A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength

All of the cord material in a B. F. Goodrich grommet belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. There are no layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced. And grommet V belts stretch less—only ⅓ as much, on an average, as ordinary V belts.

Better grip, less slip

Grommet V belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

They cost no more

Grommet V belts cut costs because they last longer, increase production because machines keep running with fewer interruptions, reduce maintenance costs because they need less attention, yet they cost not one cent more. Available in C, D and E sections. But remember, only B. F. Goodrich makes the grommet V belt (U. S. Patent No. 2,233,294), so to get all these savings, call in your local BFG distributor the next time you need V belts, or write *The B. F. Goodrich Company, Industrial & General Products Division, Akron, Ohio.* (Available in Canada)

Grommet V-Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

In the Penwell, Texas, field . . . where average service from competitive quality pumps was about 5 WEEKS

a HI-BRIN Pump

installed April 16, 1952

• • • gave over 34 weeks of Service

HERE'S THE STORY

Corrosion inhibitors have been used continuously throughout these comparison periods, because of severe Hydrogen Sulphide conditions.

On April 16, 1952, a 2" x 1½" x 10' "Oilwell" top hold-down, stationary barrel HI-BRIN pump was installed with superhard Nickel-Iron plunger fitted with gas valve and single solid Stellite balls and seats.

Following failure of a special cage, used in the original assembly, this "Oilwell" pump was pulled December 6, 1952. The HI-BRIN barrel was found to be in excellent condition, with the Nickel-Iron plunger worn less than .001" and after re-assembling, the pump was returned to service in the same well on December 8, with repair costs of only $20.05.

You'll be hearing a lot about HI-BRIN

Try HI-BRIN Pump Barrels in YOUR "problem wells"

OIL WELL SUPPLY
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Executive Offices — DALLAS, TEXAS
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USS "OILWELL" TRADE MARK

UNITED STATES STEEL

FOR SEVERE THROTTLING AND FLOW CONTROL SERVICES . . .

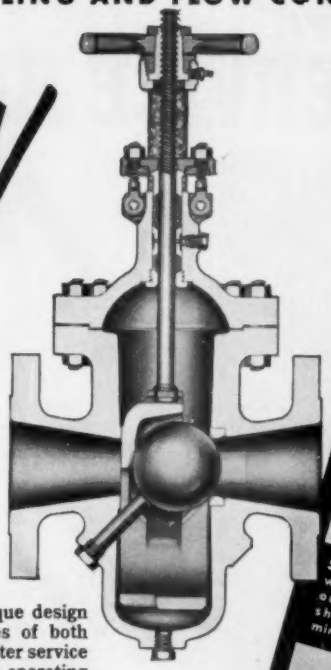
NEW

CRANE-PAUL
Venturi-Ball
VALVES

(Patented and Patents Pending)

CAST STEEL OR CRANE 18-8Mo ALLOY

Outside Screw and Yoke—Flanged. Available with sliding stem for assembly with power operators.



Fully closed with ball disc locked in outlet port. Ball seldom seats in same position, thus minimizing wear and erosion.
Smooth opening begins when ball cage "rolls" ball out of its seat. Crescent shape opening permits minute throttling.
Inclined surfaces in the cage lift the ball disc clear of the seating surface.
Fully opened with U-shaped bottom of cage bridging the gap in body to form a continuous flow passage.

Meet the Crane-Paul Valve—a unique design that combines desirable advantages of both gate and globe valves. It provides better service and longer life under more rigorous operating conditions than such valves normally stand. These features include—

Exceptionally accurate throttling with a minimum of wear and erosion, resulting in long-lived seating surfaces.

Straight-through, non-turbulent flow—with pressure drop characteristics approaching those of venturi-type gate valves.

Smooth, easy response throughout the entire range of operation.

Completely tight shut-off.

Heart of this new Crane-Paul Valve is a precision-ground ball disc which rides loosely in a cage direct-connected to the valve stem. In operation, the ball is moved to and from the center of flow and rolls into and out of the body seat. At no time during valve operation does the ball spin or chatter, even in closely throttled positions. It revolves just enough to provide a new seating surface each cycle. In the closed position, part of the ball actually protrudes into the outlet port where it is tightly seated by the wedging action of the ball cage.

Literature Sent on Request

Full information on this new Crane-Paul Valve is in your Crane 53 Catalog. Literature is available from your Crane Representative or on request to address below.

Cast Steel
150-Pound, Sizes 1 through 6"
300-Pound, Sizes 1 through 8"
600-Pound, Sizes 1 through 4"

Crane 18-8Mo Alloy
150-Pound, Sizes 1 through 6"
300-Pound, Sizes 1 through 8"

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

The Oil and Gas Journal, published Mondays, copyright 1953, by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910 at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $4 yearly.

Before you buy:

CHECK SERVICE RECORDS!

Two rugged LS-85's, delivering 92 net hp each, speed a pipelining job by cleaning out a caved ditch near Many, La.

Quality construction slashes maintenance costs . . . matchless service minimizes downtime

WHAT OWNERS AND OPERATORS SAY ABOUT LINK-BELT SPEEDERS . . .

OWNER—"Only service in 18 months was two sets of cable, minor dipper repairs."
OWNER—". . . really fine distributor service."
OWNER—"My Link-Belt Speeder not only replaced two smaller rigs, but cost only $115 for service in five seasons!"
OPERATOR—"Running it over two years with no downtime."
OWNER—"Best dollars I ever spent . . ."
OPERATOR—". . . easy access for service. Self-cleaning crawler treads are really good!"
OPERATOR—"Only one clutch adjustment in eight months!"

WITH a Link-Belt Speeder, you're sure to get maximum production at minimum cost—not only for this season . . . *but for many seasons to come!* Also, with Link-Belt Speeder's world-wide factory-trained distributor service, you can be sure of prompt, expert service or parts replacement when you need them.

What's more, in every area there is a Link-Belt Speeder resident service engineer. It's his job to be acquainted with you and your particular problems.

If you'd like more information about the most complete line of crawler, wheel or truck-mounted shovel-cranes write for Catalog 2373.

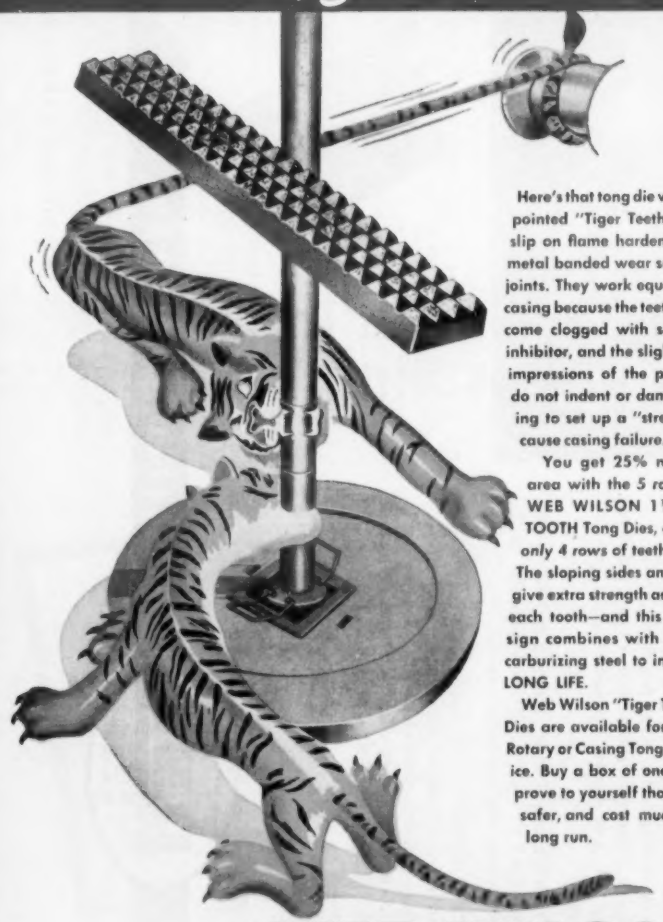
LINK-BELT SPEEDER CORPORATION
Cedar Rapids, Iowa

13,052

LINK-BELT SPEEDER CORPORATION
BUILDERS OF A COMPLETE LINE OF CRAWLER, TRUCK AND WHEEL-MOUNTED SHOVEL-CRANES

FACTORY-TRAINED DISTRIBUTOR SALES AND SERVICE SPECIALISTS . . . EVERYWHERE

WEB WILSON *Tiger Tooth* TONG DIES



Here's that tong die with the sharp, pointed "Tiger Teeth" that won't slip on flame hardened, or hard-metal banded wear subs and tool joints. They work equally well on casing because the teeth do not become clogged with scale or rust inhibitor, and the slight, pin-point impressions of the pointed teeth do not indent or damage the casing to set up a "stress riser" and cause casing failure.

You get 25% more gripping area with the *5 rows of teeth* in WEB WILSON 1¼-inch TIGER TOOTH Tong Dies, compared with *only 4 rows* of teeth in other dies. The sloping sides and heavy base give extra strength and backing to each tooth—and this efficient design combines with high grade carburizing steel to insure EXTRA LONG LIFE.

Web Wilson "Tiger Tooth" Tong Dies are available for use in *any* Rotary or Casing Tong now in service. Buy a box of one dozen, and prove to yourself that they are far safer, and cost much less in the long run.

WEB WILSON Oil Tools INC.

FIELD PROVEN

I'M "JIFFY" THE TONG DIE DRIVER

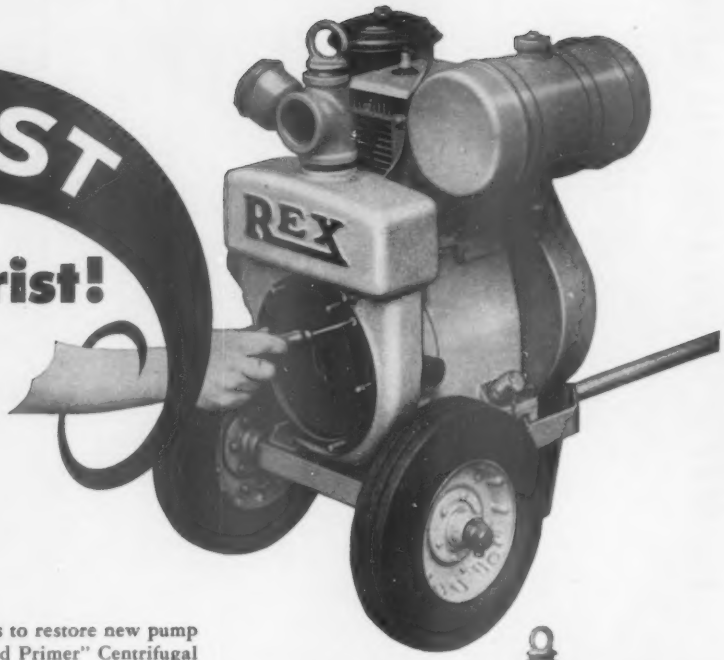
I drive 'em, in and I drive 'em out! And the men who "knock" me most are my best friends. I put up a hard front to give years of service—But I'm softer in the rear end so you can hammer away without having any chips popping off to hit you in the eye—And my overhanging upper lip keeps any pieces of the die from flying around.

TONG MEN, listen a minute . . . Haven't you had enough of trying to drive tong dies in or out with a bolt or a cold chisel, or whatever was handy? Want to stop mashing fingers, and get away from those flying chips off hardened tong dies that can put out an eye or cut your hands or face like a razor? ★ Here's how we'll do it . . . I'm *"Jiffy"* and I came into this world for just one reason—to work with men like you to save you a lot of grief. You'll go for me on sight, and if your tong dies are 1 inch wide I'll work for years and years for only $7.50. If you are using 1¼ inch dies, make it $10.00. ★ You won't have any trouble getting the boss to buy me when he sees how I save time and money and accidents. In fact, he'll probably get *"Jiffy"* Twins just in case one of us gets misplaced somewhere. Ask him the next time he's on the rig—the name is "Jiffy."

P-S-S-T . . . let me whisper to you Safety Engineers. ★ If you really knew how I cut accident rates you would personally introduce me to every crew on every rig under your eagle eye. Crews gladly stop using bolts, cold chisels (or what have you?) when *"Jiffy"* comes on the job to install and remove tong dies. I keep chips or pieces from flying off hardened tong dies to injure eyes, hands or face, and I save a lot of mashed fingers. ★ Any Web Wilson man has *"Jiffy"* Tong Die Drivers in his car for immediate delivery—ask him!

14905 South San Pedro Street, (Mail Address: Box 96) Los Angeles 2, California

just a TWIST of the wrist!



. . . That's about all it takes to restore new pump efficiency to the Rex® "Speed Primer" Centrifugal Self-Priming Pump even after many, many hours of rugged service. In every self-priming centrifugal pump, the air peeler is the most important single factor in priming efficiency. Rex is the only pump with an *adjustable* air peeler.

HERE'S HOW SIMPLE IT IS! Just remove cover plate . . . remove one bolt . . . drop peeler to just clear impeller . . . tighten the setscrew . . . replace the cover plate . . . and you've restored original priming efficiency.

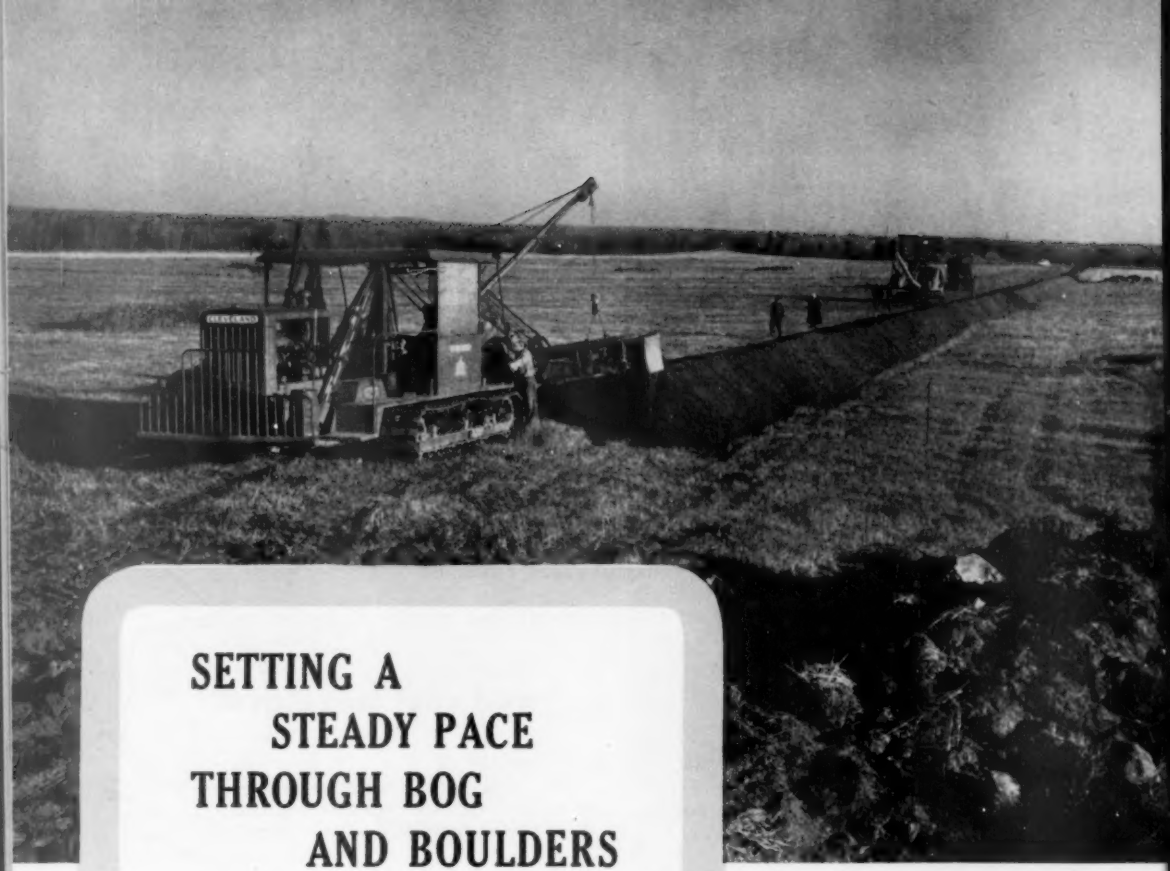
There are only 6 basic parts to a Rex Pump (see illustration) . . . all readily accessible for quick, easy maintenance and replacement.

This simplicity means *longer pump life . . . sustained efficiency* and, above all, more *economical operation*—with Rex there's less chance for trouble . . . far lower maintenance costs . . . more gallons of liquid pumped per dollar of fuel and per dollar of cost.

See the new Rex line of Oil Field Utility Pumps at your oil field supply store, or write for Bulletin 51-37, which contains the complete story. Chain Belt Company, 4619 W. Greenfield Ave., Milwaukee 1, Wis.

CHAIN BELT REX COMPANY ®

OIL FIELD EQUIPMENT . . .



SETTING A STEADY PACE THROUGH BOG AND BOULDERS

This Cleveland trencher model 320, equipped with a Caterpillar D8800 Engine, is working on the 1,600-mile Lake Head pipe line near Floodwood, Minn. Let's hear what Mr. Carl C. Anderson of Anderson Bros. Corporation, Houston, Texas, has to say: "Difficult terrain makes the going rugged. This post-glacial region has a great deal of wet bog country. However, the greatest obstacle is the frequent masses of buried rock and boulders along with many tree roots. The D8800 has been performing through all this rough going without a hitch. It is very economical on fuel and oil."

Reliability and low-cost operation are characteristics typical of *all* Caterpillar equipment. These and other advantages recommend your standardization on the rugged yellow machines. What other advantages? For example, simplified operator maintenance. Interchangeability of parts. Use of low-grade, low-cost fuels without fouling. A minimum of down-time. And excellent service from *one* dealer – the Caterpillar Dealer nearest your job. Even when you're miles from nowhere, your Caterpillar Dealer will back you up with fast, on-the-spot service when you need it!

Leading manufacturers of ditchers, shovels, compressors and other equipment can supply Caterpillar power in the machines they build. Engines are available up to 500 HP – electric sets up to 315 KW. For proof of profitable performance – and a demonstration – see your nearby Caterpillar Dealer!

CATERPILLAR, PEORIA, ILLINOIS

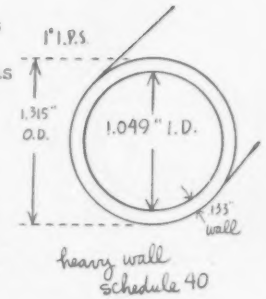
CATERPILLAR

REG. U. S. PAT. OFF.

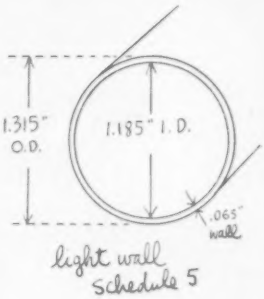
OILFIELD ENGINES

Why pay for Schedule 40 pipe where Schedule 5 is more than adequate ?

Back in the days when iron pipe was virtually the only kind available, it was necessary to specify this



But today with the high strength/weight ratio of stainless steel, the great majority of pipeline and process applications will have an ample margin of safety with this



All sizes of Carpenter Schedule 5 pipe will easily handle 150 psi working pressures. Sizes under 1½" will safely handle considerably higher pressures.

By specifying this light wall stainless pipe you gain many advantages:

1. You save money. Schedule 5 pipe costs about half as much per foot as Schedule 40.
2. Schedule 5 has the same O.D. as Schedules 10, 40 and 80—for hook-up with existing lines as well as for new installations.
3. Its larger I.D. increases flow and capacity in pipelines, exchangers and other equipment.
4. It's lighter. This means quicker and easier installation.
5. You can save 10% to 25% on valves, fittings, weld rods, etc., because smaller O.D. material can frequently be used.
6. Fittings are available from several manufacturers . . . and stocks of Schedule 5 pipe are carried by conveniently located Carpenter distributors.
7. Tubing sizes can now be replaced with light wall pipe . . . for ready hook-up with standard valves, pumps, etc.

Light wall Schedule 5 pipe saves dollars—and makes a lot of sense!

For complete data on Carpenter Schedule 5 Stainless Pipe, call your nearest Carpenter distributor or write us direct. We'll be glad to send you the information you need. THE CARPENTER STEEL COMPANY, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N.Y. "CARSTEELCO"

Carpenter

THE U.S. NEEDS YOUR STEEL SCRAP NOW

STAINLESS TUBING & PIPE

Analysis · Tolerance · Finish

- guaranteed on every shipment

Cut Your V-Belt Costs Right Now!

—this test tells how!

If you want longer V-Belt wear and lower V-Belt costs just make this simple test. Bend any V-Belt that has *straight sides* and—as it bends—*feel* the sides bulge out! (See Fig. 1-A, below)

This out-bulge forces the belt to press unevenly against the V-pulley and of course wear on the belt is concentrated where it bulges most. Naturally this shortens the life of a *straight-sided* V-Belt.

Now, make this same test with the belt that is built with *concave sides*—the Gates Vulco Rope!

See the difference? There is no *out-bulge!* The precisely engineered concave sides *fill out* and become *perfectly straight.* They now *exactly fit* the sheave groove and therefore *press evenly* against the V-pulley. This distributes all wear *uniformly* across the *full width* of the Gates Vulco Rope. And this means longer belt life and *lower belt costs* for you.

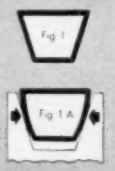
Only V-Belts made by Gates are built with concave sides. Whenever you buy V-Belts, be sure that you get the V-Belt with Concave Sides—the Gates Vulco Rope!

Gates Engineering Offices and Jobber Stocks are located in all industrial centers of the United States and in 71 foreign countries.

This cable tool drilling rig used by driller John E. Mackey, Ada, Mich., was driven by a roller chain. Mr. Mackey reports that drilling shocks transmitted by the chain broke at least three outboard shafts during the digging of every well. Mr. Mackey says, "I've driven two wells since I put V-Belts on this drive and haven't broken any shafts at all. Right there is a saving of over $1000."

What Happens When a V-Belt Bends

Straight-Sided V-Belt



How a Straight-Sided V-Belt Bulges in the Sheave-Groove. Sides Press Unevenly Against the V-Pulley, Causing Extra Wear at Point Shown by the Arrows.

Gates Vulco Rope With Concave Sides

The Concave Sides Fill Out to Precise Fit in Sheave-Groove. No Side-bulge! Sides Press Evenly Against the V-Pulley —Uniform Wear and Longer Life!

CS-531

Gates® VULCO ROPE DRIVES

THE GATES RUBBER COMPANY • DENVER, U.S.A.

V-Belts — Hose
Molded Rubber Goods
for industry
World's Largest Maker of V-Belts

NEW!

SEND FOR THIS

12-PAGE BULLETIN D-1L

JUST OFF THE PRESS

This bulletin contains specifications, engineering and performance data, photos and descriptions of recommended types of filter media, check list of liquids that can be filtered and other helpful data.

- CUTAWAY DRAWINGS
- LIST OF LIQUIDS THAT CAN BE FILTERED
- GENERAL SPECIFICATIONS
- PERFORMANCE DATA
- TYPES OF FILTERING MEDIA
- INSTALLATION PHOTOS AND DATA
- PROJECT DATA SHEET

DOLLINGER
w/ PROTECTOMOTOR
STAYNEW FILTERS

DOLLINGER
CORPORATION

5 Centre Pk., Rochester 3, N. Y.

ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

LAYNE WATER WELLS

. . . are part of BELL AIRCRAFT'S amazing growth

If you are interested in a water well installation, please write for more information about Layne services.

One of America's most interesting sagas of industry, is the amazing growth of Bell Aircraft Corporation's Helicopter Division at Hurst, Texas. From this great plant Bell "eggbeaters" have gone to all parts of the world—both for war and peacetime service.

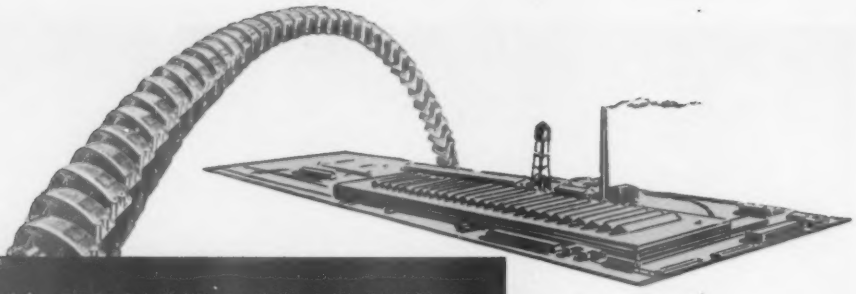
When Bell Aircraft selected a site for their big Texas plant, they immediately ordered the installation of a complete Layne Water Supply System. Today that single Layne installation is more than fulfilling all water supply needs for both manufacturing and employees—and apparently can continue to do so for many years to come. Layne is happy to name Bell Aircraft Corporation as another in a long list of important industrial organizations that own Layne Water Wells and Pumps.

LAYNE & BOWLER, INC.
General Offices, Memphis 8, Tenn.

Layne

Without obligation Layne will be glad to provide a complete file of late catalogs and literature on modern water supply wells and high efficiency vertical turbine pumps.

WATER WELLS
VERTICAL TURBINE PUMPS
WATER TREATMENT



OVER ¼ MILLION HORSEPOWER AND NOT A SINGLE FAILURE

That is the record of Farrel® speed increasers in pipeline pumping service.

These units were first developed in a standard series twenty years ago. Since then, although hundreds and hundreds have been installed throughout the oil industry, *not one has ever failed on the job.*

This amazing record is worth remembering the next time you are in the market for speed increasers. It provides a virtual guarantee of trouble-free performance.

The modern line of Farrel speed increasers consists of 49 standard sizes with speed ratios ranging from 1:1 to 12:1. For higher ratios, units using two sets of gears are supplied with ratio range from 12:1 to 40:1.

For further information, send for a copy of Bulletin No. 448A. No cost or obligation.

FARREL-BIRMINGHAM COMPANY, INC. • ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

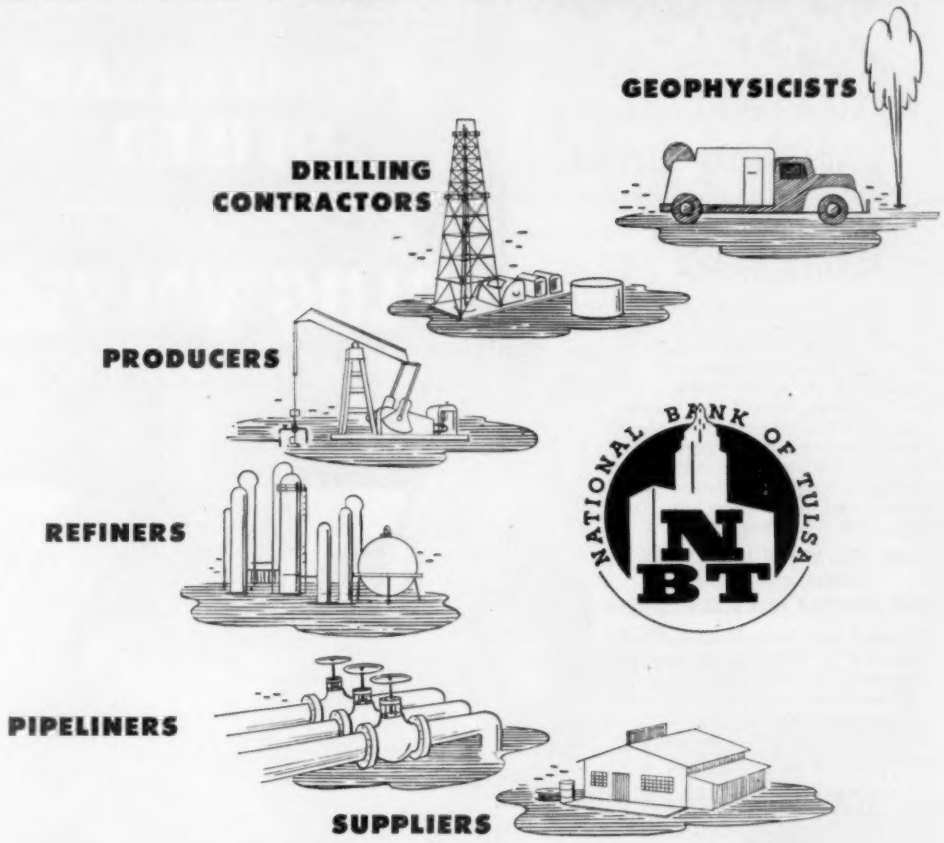
Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Detroit, Chicago, Memphis, Minneapolis, Portland (Oregon), Los Angeles, Salt Lake City, New Orleans

OIL FIELD REPRESENTATIVES—Hercules-Lupfer Engine Sales Co., 124 N. Boston St., Tulsa 1, Okla.
V. W. Osborne, 860-A M&M Building, Houston 2, Texas

FB-780

Farrel-Birmingham®

ASK THE MEN WHO KNOW...



...Why NBT Oil Loans Pay off

Hundreds of men in every phase of the oil industry are familiar with the experienced oil finance services of National Bank of Tulsa. They know they can discuss their problems and requirements freely with NBT's friendly oil loan officers. They know they can count on NBT for practical knowledge, prompt action and adequate resources . . . a definite advantage when you need quick service. The bank to see is NBT.

The Oil Bank of America

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- **EXTRA-LONG, LEAK-PROOF SERVICE**
- **MINIMUM MAINTENANCE**

HOMESTEAD REISER

Self-Seald...Lubricated

PLUG VALVES

NOW—AT NEW LOW PRICES!

Nine years of gruelling service in almost every type of industry, have proved that HOMESTEAD-REISERS afford the lowest-cost-per-year fluid control of all valves within their service range. Extra-long, leakless service; more operations between lubrications—up to 22 times more by actual tests with other well-known lubricated plug valves—less maintenance and lower plant operating costs result from their use.

AND NOW, AT NEW, LOWER PRICES, HOMESTEAD-REISERS ARE MORE THAN EVER, YOUR BEST VALVE BUY!

We make them in semi-steel or cast-steel; 100% Port Area or Venturi; in sizes ½" to 14", for steam working pressures to 150 lbs., or oil-water-gas to 200 lbs.

Order today and prove them to your own satisfaction.

The Self-Seald Principle

Homestead-Reiser's self-sealing action is based on what we believe is the most effective sealing principle ever developed for lubricated plug valves. Its secret is the wedge-action of the two-piece plug which, under line pressure, causes the finely finished surfaces of the plug to press constantly outward against the body and thus *automatically* compensate for wear. A full lubricant seal surrounds the ports, and the top and bottom of the valve.

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VALVE MANUFACTURING CO.

"Serving Since 1892"

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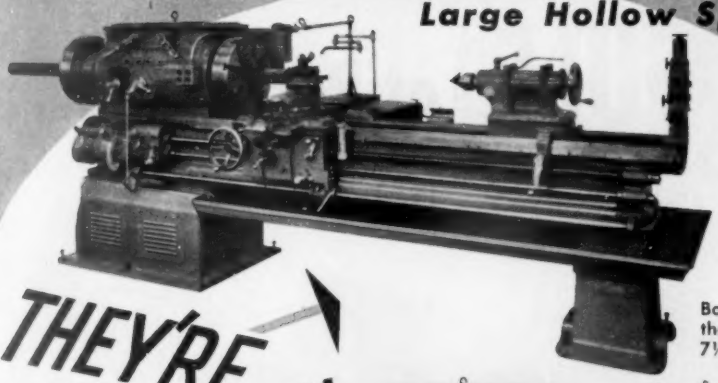
FOR FASTER PRODUCTION, BETTER WORK, LOWER COSTS–

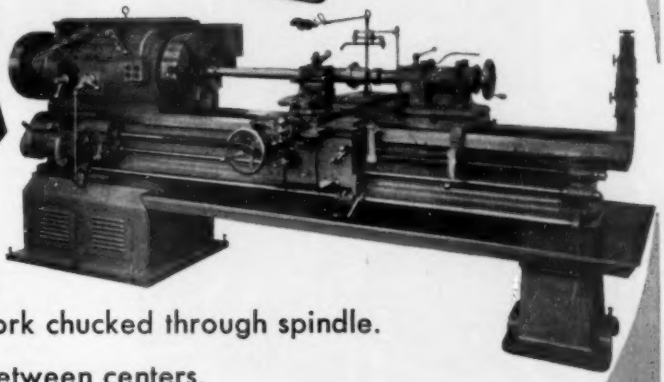
HYDRATROL LATHES

Large Hollow Spindle Type



Both Illustrations Show the 18" Hollow Spindle 7⅛" Hole

THEY'RE VERSATILE!



- Machine long work chucked through spindle.
- Machine work between centers.
- Also built with beds and carriages on each end of headstock for machining both ends of a shaft at one time.

SIZES 18" TO 36"

Small – 18" & 20" up to 7⅛" Hole
Medium – 25" up to 12" Hole
Large – 32" & 36" up to 16⅛" Hole
(Standard Type Lathes 16"-36")

IMPORTANT FEATURES

Timken Bearing Spindles.

Hydraulic clutches for forward and reverse, controlled from apron or headstock.

Hydraulic brake for close position control.

Hydraulic clutches self-compensating. No adjustment and full power capacity at all times.

LEHMANN MACHINE COMPANY

CHOUTEAU AT GRAND • SAINT LOUIS 3, MISSOURI

GULF at Port Arthur...

is using

Depend upon it—when petroleum refiners engineer a plant, they call for components they can depend upon. Like many other oil companies, they include OIC Valves—used in this Gulf Oil Company plant.

OIC Valves are *precision engineered, precision built, precision applied.* OIC engineers will help you choose the valves to do each job at lowest cost.

Write for your free copy of the newly revised "OIC Valve Cross-Reference Chart" to The Ohio Injector Company, Wadsworth, Ohio.

This huge tube still is a key unit in the production of the famous Gulfpride Motor Oil at the Port Arthur, Texas, Refinery of Gulf Oil Corporation. This refinery is one of the largest in the world, with a rated capacity of over 200,000 barrels per day.

OIC
FOUNDED 1883

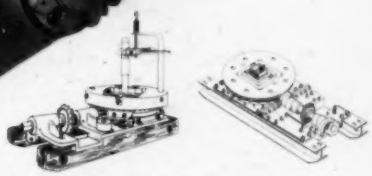
VALVES

FORGED AND CAST STEEL · IRON · BRONZE

BREWSTER RSH ROTARIES

MODELS 18" - 22"

OVER 40 Years EXPERIENCE



Over twenty-five years ago, Brewster was producing these early model rotaries, forerunners of the modern RSH.

THE Brewster RSH line of rotaries is manufactured to meet the need for a rotary of exceptionally high quality. It is the culmination of years of development work in which each successive model has been fully tested in the field. Today the RSH incorporates the features which have been found most desirable in actual use by drillers and drilling contractors. Every element has been planned to offer you the ultimate in rotary design.

Ask your nearest supply house for full information on the Brewster RSH Rotary.

RSH IMPROVEMENTS

TRIPLE GROOVE MUD SEAL Lubricated labyrinth with three closely fitted rings seals gear compartment from drilling mud.

HOLD DOWN BEARING Anti-friction ball type bearing keeps gears accurately meshed and holds table in alignment under heavy loads.

RUGGED CAST STEEL BED Thoroughly heat treated to develop maximum physical properties. Rigid construction prevents distortion under heavy loads and maintains exact alignment of gears.

THE BREWSTER COMPANY, INC. SHREVEPORT, LOUISIANA

BREWSTER DRILLING EQUIPMENT

ASK YOUR NEAREST SUPPLY HOUSE TO TELL YOU ABOUT THE BREWSTER RSH ROTARIES

Apex Equipment Company • Murray Brooks, Inc. • Reams Supply Company
Bovaird Supply Company • Industrial Supply Company • In Canada:
Rocky Mountain Supply Company – Direct and through recognized export dealers.

CAST STEEL BED Thoroughly heat treated to develop maximum physical properties. Rugged construction prevents distortion under heavy loads and maintains exact alignment of gears.

TABLE LOCK Easily accessible for rapid operation.

MUD SEAL Triple groove labyrinth seals gear compartment from drilling mud.

LOCK PIN FOR MASTER BUSHING

MASTER BUSHING

FLUSH DECK Diamond tread surface affords safer footing for men working on rig.

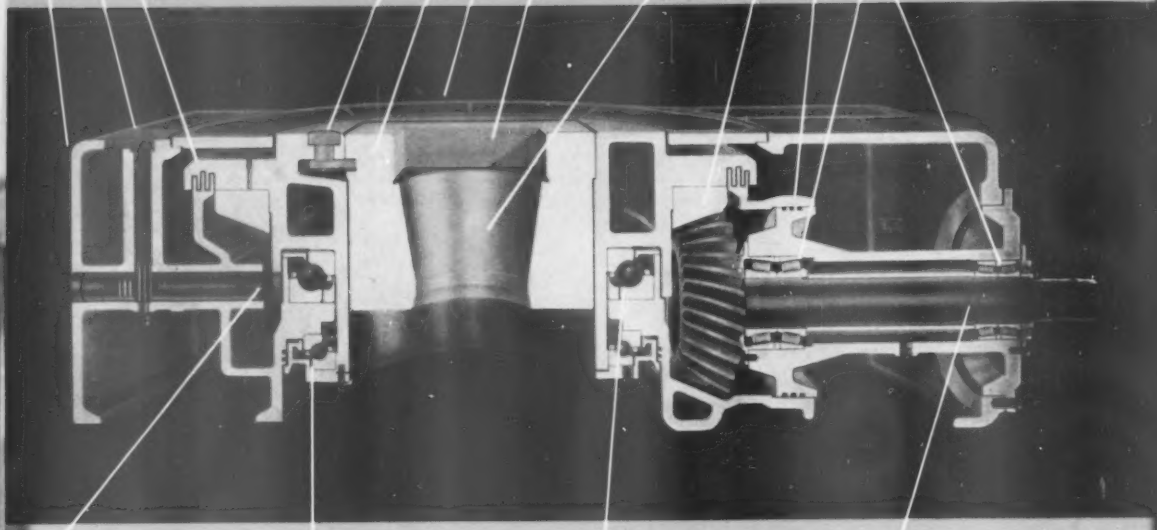
KELLY DRIVE

SLIPS

RING GEAR AND PINION Spiral bevel gears, machined from heat treated alloy steel. (oil lubricated)

OIL SEALS "O" ring type for pinion shaft cartridge assembly.

TWO ROW TIMKEN BEARINGS Non-adjustable roller type with high load capacity and resistance to shock. (grease lubricated)



LOCK PIN Engages skirt to prevent transfer of shock to gears and bearings.

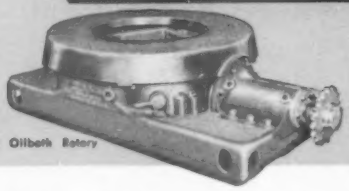
HOLD DOWN BEARING Anti-friction ball type bearing keeps gears accurately meshed and holds table in alignment under heavy loads — eliminates vertical slack in the assembly.

MAIN BEARING Heavy duty anti-friction ball type bearing with high load capacity has individual oil bath lubrication.

SHAFT Heat treated alloy steel, machined to close tolerance for accurate fit and smooth operation.

BREWSTER TYPE OB OILBATH ROTARIES

Model OB-12-S Short Shaft Oilbath Rotary

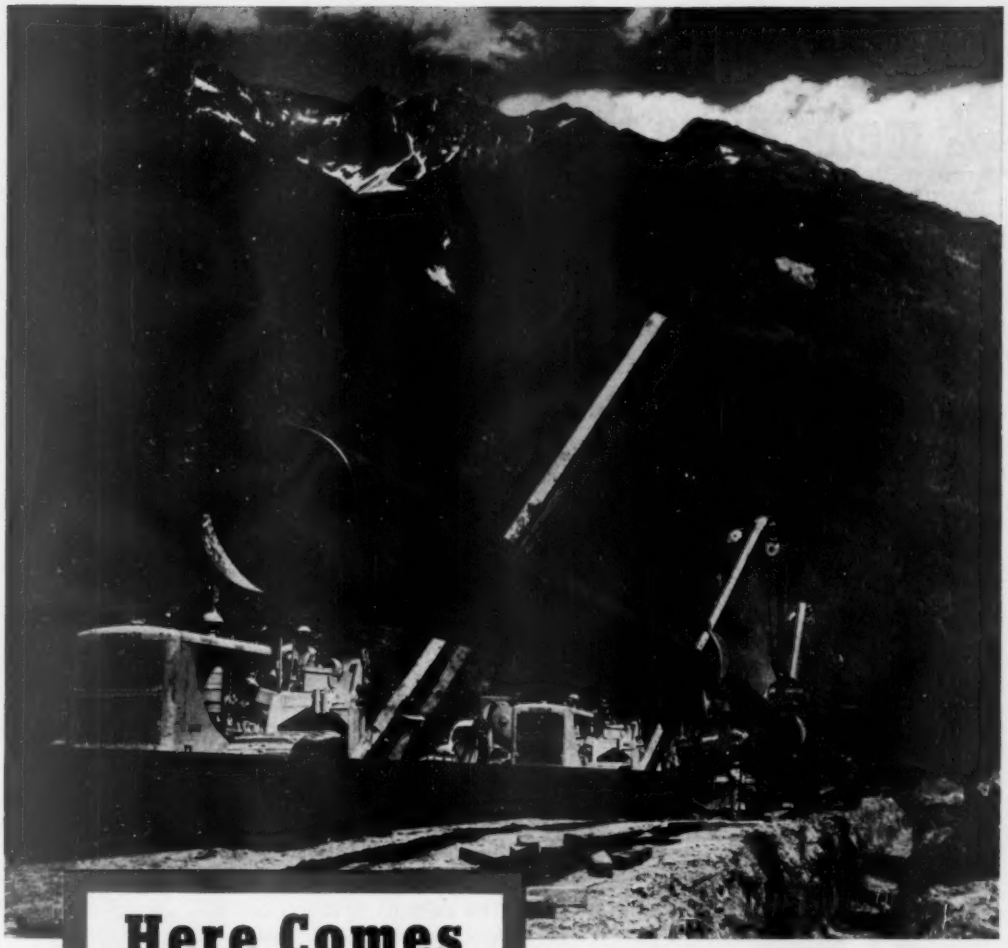


Model OB-18 Oilbath Rotary

Model OB-12-L Long Shaft Oilbath Rotary

These Brewster Model OB Oilbath Rotaries are available in two sizes, 12" and 18", full table opening. The 12" size is available in two lengths, the short model with 28½" center-to-center, the longer 44" center-to-center, and two table openings — 12" width 3"/ft. tapered slip seat and 11⅛" with 4"/ft. tapered slip seat to fit std. API slips.

THE BREWSTER COMPANY, INC. SHREVEPORT, LOUISIANA



Here Comes Opportunity

TRANS MOUNTAIN OIL PIPE LINE
is well ahead of schedule—welcome news on both sides of the border.

For this big trunk line, pioneering from Alberta to the coast, ushers in an entirely new era in Pacific Northwest oil economics. Assurance of a plentiful supply under all conditions—and at low transportation costs—makes the opportunity for industrial development more attractive than ever in the fast-growing evergreen empire.

The Bechtel organization is responsible for design and construction of the pipe line and of two refinery projects it will feed, located near Vancouver and Seattle respectively.

BUILDERS FOR INDUSTRY

BECHTEL

BECHTEL CORPORATION

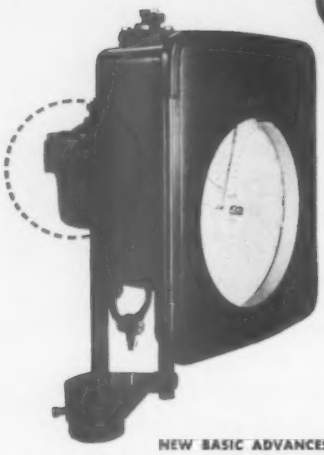
Los Angeles • **SAN FRANCISCO** • *New York*

CANADIAN BECHTEL LIMITED

A meter drive that's miles ahead...

...in sustained accuracy

...in maintenance freedom



NEW BASIC ADVANCES

- **Precision float assembly** with stainless steel ball chain and collet-type clamp insures positive, friction-free transmission of float motion through the segmental drive.
- **Pressure-Seal Bearing** is virtually friction-free, completely leak-proof.
- **Sure-Seal Check Floats** insure perfect seating; submerged in mercury to prevent frosting and fouling.
- **Union-coupled U-bend** eliminates gaskets; always lines up.
- **Calibrated Damping Plug** fully adjustable under pressure.

New, outstanding advances in the basic details of Foxboro Flow Meters provide unprecedented standards of dependable accuracy.

For example, Foxboro's exclusive, segmental drive assembly, which eliminates angularity errors altogether, now employs: ❶ stainless steel ball chain that insures perfectly free travel of float . . . ❷ slip-proof collet for positive clamping of segment to the bearing shaft.

Check *all* the advantages of Foxboro Flow Meters, including extra power due to large floats and long travel; float located in high pressure chamber to minimize ambient temperature effects; submerged-in-mercury check floats which prevent mercury losses; unvarying accuracy throughout years of use. Write for Bulletin 460. **The Foxboro Company, 602 Neponset Ave., Foxboro, Mass., U.S.A.**

FOXBORO REG. U. S. PAT. OFF. **... First in FLOW METERS**

HALLIBURTON'S S-3 CENTRALIZER

makes downright sure your casing's centered

One of the most profitable low cost investments you can make in the entire life of your well is Halliburton's new S-3 centralizer. You can be downright sure your casing's centered and yet have free circulation flow in the annulus.

Halliburton's exclusive design uses special heat-treated springs that are proven to have less permanent set than any other centralizer. They arrive on bottom with positive centering force and are so constructed that fewer springs cover more side wall, assuring better circulation in the annulus.

Furthermore, these rugged springs are lap welded to hinge-type end bands. With load point on the band and ample clearance between casing and end bands, the Halliburton S-3 produces less drag on rotating casing than any other centralizer on the market!

QUICKLY, EASILY INSTALLED WHILE RUNNING CASING... With no on-the-job adjustments necessary, one size S-3 for each casing O. D. size covers all standard hole sizes for any given casing. It saves you money in every way... is one of the most profitable low cost investments you can make. So phone your nearby Halliburton representative now. Or write Halliburton Oil Well Cementing Company, Duncan, Okla.

HALLIBURTON

YEARS AHEAD IN PRODUCTION IMPROVEMENT TECHNIQUES

CABOTS FOR

To pump for more profit, equip your next well thus:

***CABOT Unit**
J&L Tubing
AXELSON Pump
AXELSON Rods
FAIRBANKS-MORSE "ZC" Engine
or
CENTURY Motor

Each item is good. Together they make the All-American production team with the odds greatly in your favor.

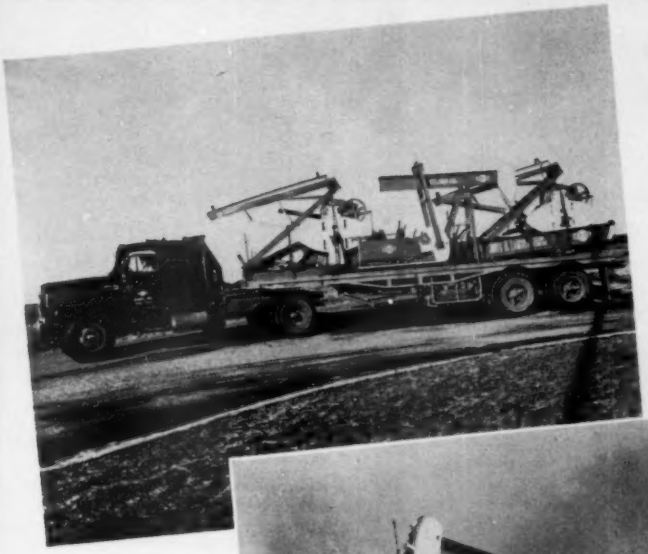
*Exclusive Distributors

JONES & LAUGHLIN STEEL CORPORATION
SUPPLY DIVISION

J&L STEEL

***General Offices:* TULSA, OKLAHOMA**
88 STORES • 19 OFFICES • 9 RESIDENT SALESMEN
EXPORT: 405 Lexington Ave., New York, N. Y., U. S. A.

MORE PROFIT



CABOT®

Factory-to-Lease

Save time, freight, and handling. Ask us about CABOT Units delivered to your lease by men trained in service and assembly.

PESA

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

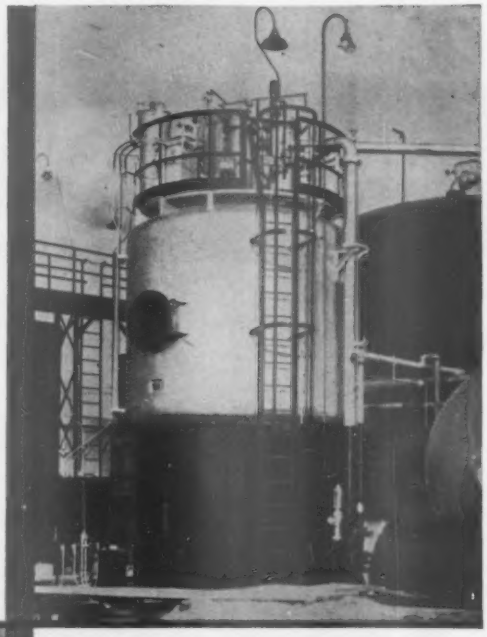
PARTNERS IN PETROLEUM PROGRESS

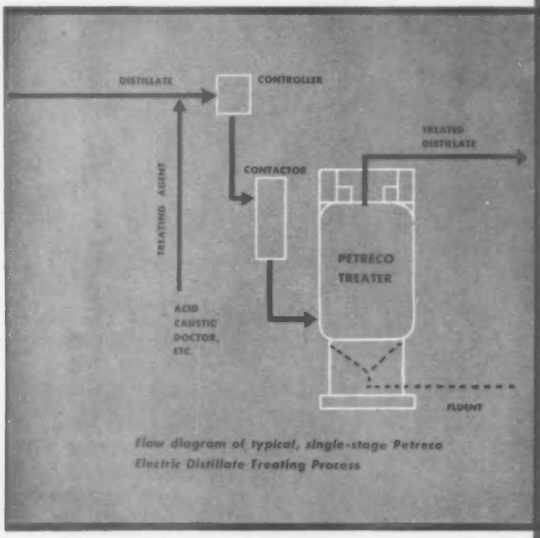
Be sure to get the facts on the NEW

PETRECO

ELECTRIC DISTILLATE TREATING PROCESS

The new Petreco Electric Process takes the guesswork out of distillate treating. It is applicable to acid, alkali or doctor treating of distillate stocks such as naphtha, gasoline, kerosine, cat-cracker charges, cat-cycle oils, diesel fuel and furnace oil.





Flow diagram of typical, single-stage Petreco Electric Distillate Treating Process

ADVANTAGES

COMPACT — requires minimum space, minimum equipment.

ECONOMICAL — uses less treating agent, gives higher product yield.

AUTOMATIC — injection, contacting and separation are automatically precision-controlled.

RELIABLE — the automatic, precision-control assures definite, predictable results.

EFFICIENT — treated distillate is relatively free of pepper-sludge, caustic, doctor solution.

POSITIVE — assures a quick break and complete separation. Amount of acid-sludge is reduced and is more suitable for re-use or recovery; emulsion in caustic effluent is eliminated; no blackstrap is formed in doctor treating.

NON-POLLUTING — the system is entirely closed. There is no chance for irritating fumes to escape.

COMPLETE — water washing is eliminated, except in some unusual cases.

EASILY MAINTAINED — the closed system, with no moving parts, stays clean; does not break down.

PETRECO

ELECTRIC PETROLEUM PROCESSING

CRUDE OILS: REMOVAL OF SALTS, SOLIDS, OTHER IMPURITIES; DEHYDRATING

DISTILLATES: ACID TREATING; CAUSTIC TREATING; DOCTOR TREATING

FUEL OILS: DESAPONIFICATION, ASH REMOVAL

For complete information, call or write

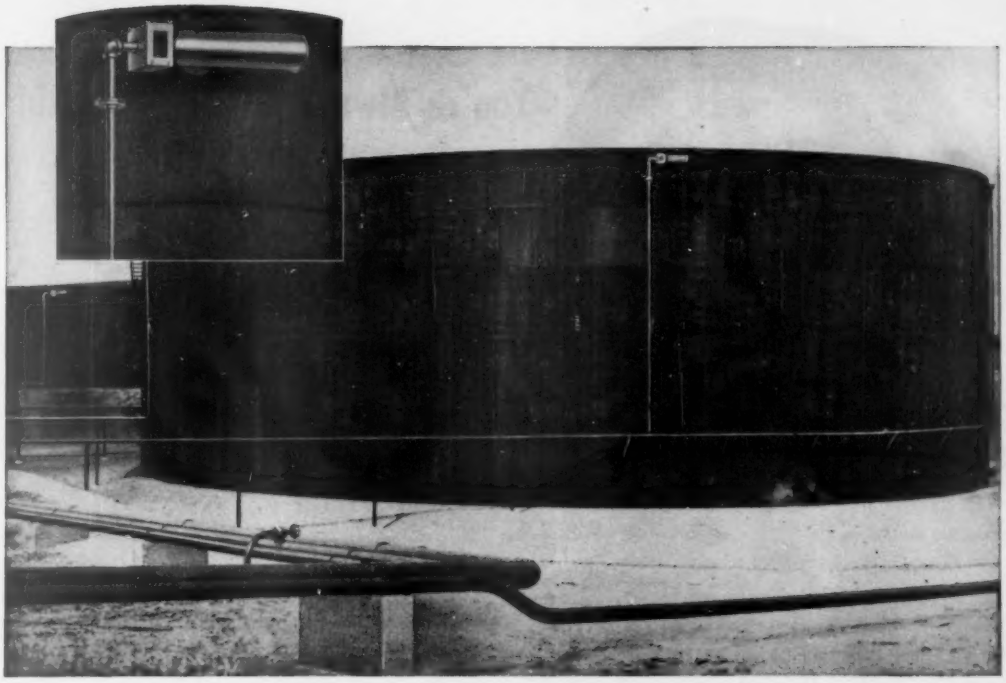
PETROLITE CORPORATION

PETRECO DIVISION

3202 South Wayside Drive, Houston 1, Texas

1390 E. Burnett Street, Long Beach 6, California

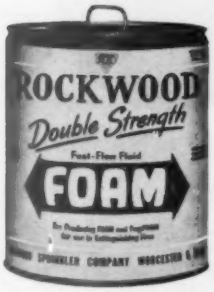
PD 53-1



Newest, Fastest Oil-Fire Extinguisher!

Rockwood's Double-Barrelled FOAM Maker Chamber Features Impinging Jet Action . . . Cuts Time And Cost Of Fire-Fighting . . . Is Easy To Install And Inspect

In the new Rockwood Double-Barrelled FOAM Maker Chamber, internal impinging jets discharge into two concentric barrels, one within the other. Providing a longer mixing time in a more compact unit, this patented construction dynamically mixes air, water and FOAM liquid — producing a finer bubble structure and a more heat-resistant FOAM blanket that puts out oil fires faster and more economically. Compactness of chamber design and elimination of supporting brackets enable easy installation from the tank's exterior. Nozzle, vapor seal, and air intake screens are readily inspected from the top of the tank. Rockwood Double-Barrelled FOAM Makers are available in a wide range of sizes to meet existing FOAM standards with maximum efficiency and economy.



Rockwood's new Double Strength Foam puts out fires in flammable liquids faster and at lower cost. Three parts FOAM liquid mixed with 97 parts water form a smothering foam blanket which quickly reseals if broken. Double Strength FOAM liquid is more fluid, faster spreading and flows freely at sub-zero temperatures (—15° F). It's quicker to put into action, covers burning surfaces faster, seals off combustible vapors completely and flows freely around obstructions. This foam blanket has proved its ability to extinguish large spill fires in gasoline with maximum speed and safety to firemen.

Rockwood's Custom Engineered Proportioning Systems are used to proportion the necessary discharge through FOAM nozzles. Spill fires in an oil refinery or fires in oil storage tanks require special proportioning systems. Custom engineered proportioning systems to meet these requirements are a Rockwood specialty.

ROCKWOOD SPRINKLER COMPANY

Engineers Water . . . to Cut Fire Losses

ROCKWOOD SPRINKLER COMPANY
104 HARLOW STREET
WORCESTER 5, MASS.

Please send me more complete information on the new Rockwood Foam Maker and Chamber explaining in detail its operation and application.

Name.....

Title.....

Company.....

Street.....

City.....

Zone.....State.....

You're Always on the Safe Side

WHEN YOU SPECIFY

ASHCROFT

Maxisafe

DURAGAUGES

Here is the gauge that provides absolute protection to the viewer from tube rupture due to any cause.

In this new Ashcroft Maxisafe* Duragauge, an integrally cast solid wall separates the dial from the Bourdon tube and movement. The entire back of the case is covered by a double spring-mounted safety release plate. Teflon coated and tightly fitted on a rubber gasket, the plate is held in place by a knurled knob. If the tube ruptures, pressure less than ½ p.s.i. will force the plate open and vent the discharge to the rear.

Always be on the safe side. Get absolute protection against the possibility of tube rupture — specify the Ashcroft *Maxisafe* Duragauge. The *Maxisafe* has all the long-life durability and precision accuracy of standard Ashcroft Duragauges. It's available in all Duragauge pressure ranges, Bourdon tube materials, case designs except Type Number 1179, and mountings, in 4½, 6 and 8½ inch dial sizes. Ask for details in selecting *Maxisafe* Duragauges. Phone your local Ashcroft Gauge Distributor.

*Reg.

NOTE THE SOLID WALL

that separates the dial from the Bourdon Tube and movement. Three ¾" lugs on the back flange hold the *Maxisafe* away from the wall and permit the safety plate to release. *The case design also provides easy, quick access to the movement and tube assembly for inspection, repair or recalibration.*

FOR FAST DELIVERY — buy from your Industrial Distributor. He stocks Manning, Maxwell & Moore products locally — saves you the trouble and expense of maintaining a large inventory in your own plant.

ASHCROFT GAUGES

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

MAKERS OF 'ASHCROFT' GAUGES, 'HANCOCK' VALVES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, BUILDERS OF "SHAW-BOX" CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

Panama-Williams lays exceptional pipe footage through Texas heat and sand storms

Here an HD-20 with side boom cradles pipe. With torque converter drive eliminating most shifting, it's amazingly simple for operator to match cradling speed to cleaning-priming and doping-wrapping machines. Because of their size and balance, these tractors can stay well away from the ditch, thus avoiding cave-ins on lowering-in.

Last summer when Panama-Williams Company laid 105 miles of 20-inch and 26-inch pipe in 65 working days it was a real accomplishment—especially considering the factors involved. First, the pipe was laid through constantly blowing sand in one of the hottest, driest summers in Texas history. Secondly, the job was accomplished with relatively few pieces of equipment.

Experience plays a big role

Based on their many years of pipeline work, M. E. "Panama" Shiflett and M. S. Williams decided on Allis-Chalmers tractors and Allied equipment for the first spread of their newly formed partnership. And because of their long experience and organizing ability, these men were able to get the most out of their equipment. For example, they laid 40 miles of 20-inch pipe in 25 work days and 65 miles of 26-inch pipe in 50 work days with the following equipment:

- 4 HD-20 Tractors with side booms
- 4 HD-15 Tractors with side booms
- 2 HD-20 Tractors with dozers
- 2 HD-15 Tractors with dozers
- 2 HD-9 Tractors with dozers
- 1 HD-9 Tractor with backfiller
- 1 HD-5 Tractor
- 1 AD-40 Motor Grader
- 1 WF Wheel Tractor
- 1 IB Wheel Tractor

Tractors stand up

On both of the above jobs it was the same story—sand, sand and more sand. It seeped in everywhere so that equipment really took a beating. In spite of the extremely adverse conditions, the Allis-Chalmers units came through in fine shape and with negligible repairs. Although the organizing ability of the partners was a big factor, neither Williams or Shiflett felt they could have matched this footage with the same amount of any other tractor equipment.

One reason for the excellent showing of this equipment is the positive lubrication seals found only in Allis-Chalmers tractors. Final drives, truck wheels, idlers and support rollers all have spring-loaded seals that keep out sand and dirt—hold the lubricant in safely. And it's a real time-saver for maintenance crews because lubricant is added only once every 1,000 hours.

But low cost maintenance and day-in, day-out performance is only part of the story. Get all the facts. Find out why more and more pipeline contractors are *going Allis-Chalmers* on their spreads. See your Allis-Chalmers dealer for complete details.

HD-15 bulls out stump on right-of-way clearing. Double reduction final drive and smooth, bottom construction provide extra clearance that helps prevent "hang-ups". Long track and 74-in. tread give the HD-15 stability and maximum flotation in mud and tough going.

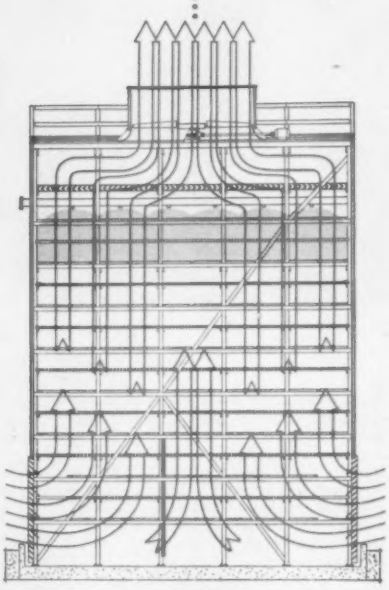
ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Efficiency of FLUOR COUNTERFLO Cooling Towers begins at the top

Heavy stainless steel fan blades are finely balanced, resist corrosion and are mounted on shafts whose exceptionally high fatigue strength has been substantiated by strain gauge tests and actual use. Pitch is adjustable to efficiently handle required air volumes at minimum tip speeds and horsepower requirements – more air per kilowatt. Speed reducers incorporating spiral bevel gears feature oil-bath lubrication and dry-air breather. The low-speed fan shaft is mounted on special steep angle thrust with radial bearings to take the combined gear thrust, fan thrust and weight of fan assembly. Driving mechanisms are built for hard-wearing, maintenance-free performance and for smooth, quiet operation.

Vibration Cut-out switches, exclusive with Fluor Cooling Towers, are an emergency safety device that stops the motor should excessive vibration accidentally occur, preventing possible damage to the tower or mechanical equipment. Design employing internal gusset plates duplicates that used in wooden bridge construction. These connectors add greater tensile and compressive strength to structural members, lower the total weight of towers, require less erection time and materially increase tower life. Sloping grid decks of rough-finished redwood with minimum one-inch dimension are used as scaffolding during erection and provide maximum deck surface with negligible air pressure drop through the tower.



Air distribution is controlled at every stage of its travel through the tower. Louver height is designed to obtain the desired intake velocity and wind-deflectors inside the tower uniformly direct air currents to all areas. Approach to the desired wet-bulb temperature is easily accomplished and performance to customer's specifications is guaranteed in every case.

Only Fluor Counterflo Cooling Towers are completely prefabricated. All cutting, drilling, and nailing is performed at the factory and tower parts are "packaged" for rapid delivery, marked for orderly assembly. More efficient control of the quality of straight-grained heart of California redwood and excellent workmanship in Fluor towers are maintained through prefabrication. Inexperienced craftsmen and laborers under Fluor's supervision can erect a Fluor tower in a minimum of time and at considerable savings in erection costs. Prefabrication means standardization; parts that may become worn or damaged over the years may be replaced economically. Uniformity of appearance as well as performance is assured.

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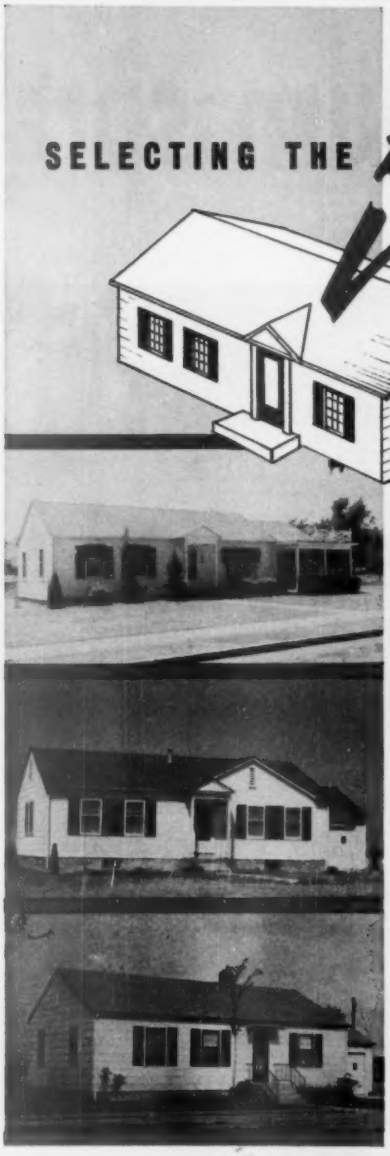

It's good employee relations to see that oil field workers have comfortable homes. It is good business to select field housing that has proved right for the oil industry for almost 35 years.

STURDYBILT Prefabricated Houses are *right* for the oil fields because they are economical, easy to erect, can be moved from one site to another, and are handsome and comfortable enough to suit the most particular oil field family.

Get the RIGHT field housing. Order STURDYBILT Prefabricated Houses.

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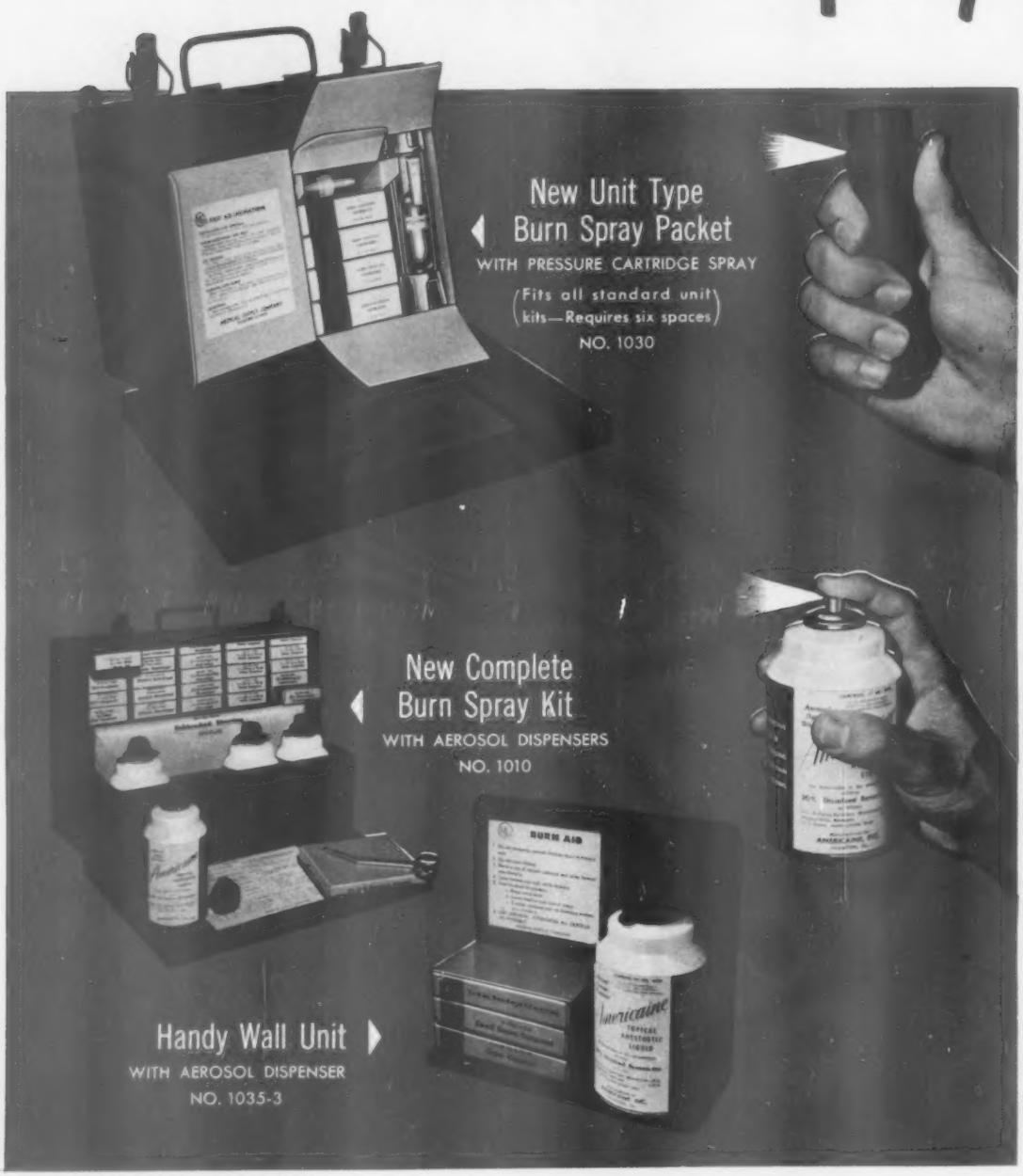
MJCO® *provides you with* **a burn spray**



kit for every need...

Quick—Thorough—Painless—Sanitary First Aid... on-the-spot! The largest assortment of burn spray kits ever offered

DOCTORS AGREE that certain basic principles or conditions are present in all cases of burns. The "first aider" is qualified only to deal with the first three: Relieve Pain—Prevent Infection—Treat Shock.

Spraying the burns is the quickest, most painless, sanitary, and thorough way to accomplish these three very important points involved in first aid treatment. Following this, the application of sterile dressings must be made when necessary, in order that the patient reach the doctor in the best possible condition for medical treatment. Consult your medical director concerning the type of medication he prefers for first aid treatment of burn cases.

The wide MSco assortment of Burn Spray First Aid Kits provides the utmost in flexibility of medications, method of spray application, and price. *All are designed to complement the unit system of first aid.*

COMPACT NEW UNIT-TYPE PACKET (No. 1030) lets you economically combine your burn spray first aid requirements with your standard unit-type first aid kits.

This six-unit size MSco packet provides a practical pressure cartridge spray gun (with Americaine or Kip Antiseptic Oil in pressure cartridges) and 10 refill cartridges containing the burn solution. *Packet fits any unit-type first aid kit.*

NEW, QUICK-ACTION AEROSOL DISPENSERS are among the several outstanding features of the new MSco *complete* Burn Spray Kit (No. 1010 and No. 1035-3).

The No. 1010 incorporates the utmost in convenience and completeness of contents. Contains 25 units of various sterile bandages and burn first aid items. New pull-out drawer contains four 11-ounce Aerosol dispensers supplied with either Americaine or Kip Antiseptic Oil.

MSco also provides a new Handy Wall Unit (No. 1035-3) with Americaine or Kip Antiseptic Oil in Aerosol Dispenser for use in boiler rooms, furnace rooms, etc. where limited first aid is required. Other types of MSco Burn Spray Kits are shown at right.

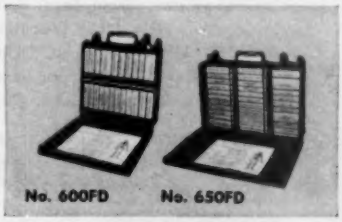
SEE YOUR COMPANY MEDICAL DIRECTOR, discuss your burn first aid problems with him. Proper first aid will save him time and save the patient needless pain. Clinical data covering burn solutions furnished in MSco Kits available on request. Also, should your medical director desire a burn first aid solution not mentioned here, MSco will provide laboratory tests for your company to determine compatability of the solution to various metals, containers, valves and propellants. Write for facts on MSco Burn Spray First Aid Kits.

FOILLE BURN SPRAY KIT

Equipped with pump-type spray gun and five 4-ounce jars of Foille Emulsion. Also contains complete assortment of unit materials to give proper first aid for all types of burns.

HYDROSULPHOSOL® BURN SPRAY KITS

Hydrosulphosol® is available in two types of unit packages, standardized into 10- and 16-unit kit assortments. Each kit contains selected assortment of sterile bandages, the 2-ounce bottle of solution with atomizer spray, and six ¼-ounce tubes of Hydrosulphosol® Gel.



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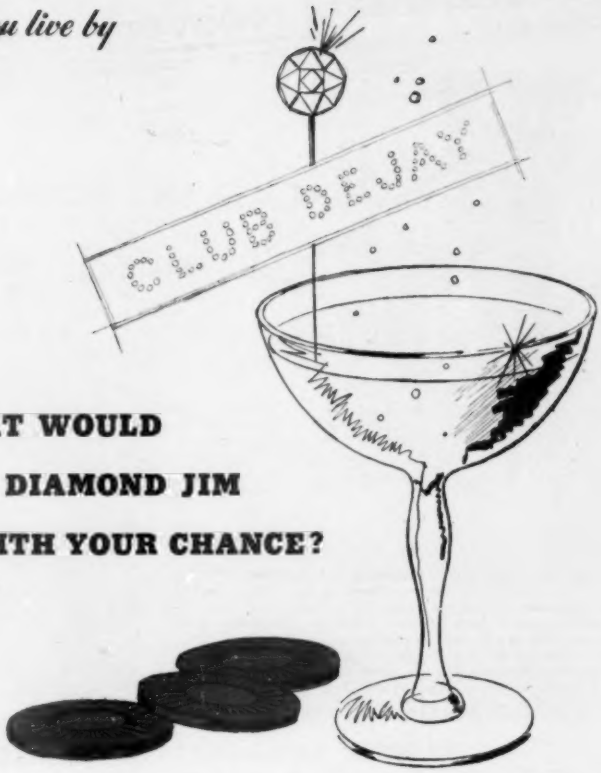

WHAT WOULD DIAMOND JIM HAVE DONE WITH YOUR CHANCE?

Fabulous "Diamond Jim" Brady, whose fame as a gambler grew with his girth, threw his money away on pure risk.

The money which the oil industry antes up against loss by corrosion is a safe bet. The odds are heavily in favor of big savings. For example, one set of figures in a producing well shows $75-$150 operating cost per month with treatment as against $550-$650 per month without treatment.

The "treatment" is with DIAMOND Chromates.

When you consider how much you stand to gain from the proper use of chemicals that fight corrosion, it's certainly worth a phone call to your DIAMOND distributor to get the details!

DIAMOND Chemicals for the oil industry: sodium bichromate and chromate as mud additives to prevent drill string failures due to corrosion, and to inhibit refinery corrosion; flake caustic soda, soda ash and bicarbonate as drilling mud control agents; oil-well grade silicate of soda to protect drill strings in heaving shale areas.

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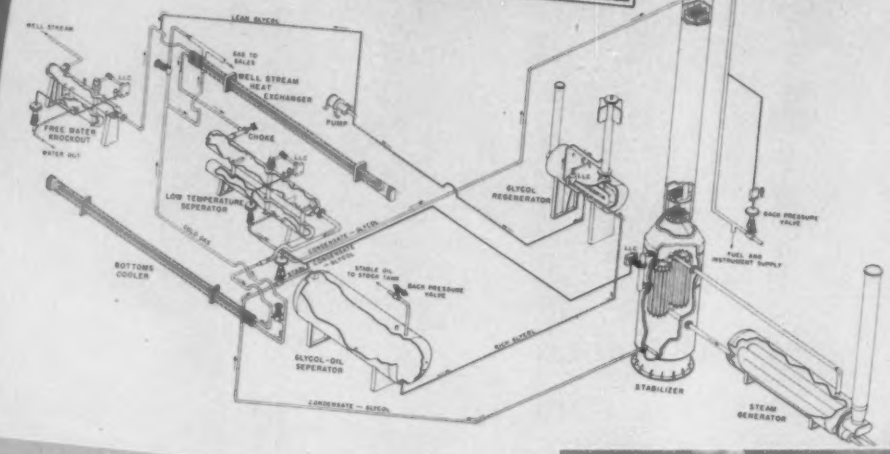
Diamond Chemicals for the Oil Industry

DIAMOND ALKALI CHEMICALS

A complete plan for condensate recovery



Here's a typical flow chart that has already become a practical and profitable reality for a good many operators. The BS&B Glycol Injection System of Low Temperature Separation, with Stabilizer, has been installed and proven by both major and independent companies. The picture at right shows a typical installation. The results of actual field tests printed below show how a major oil company proved for themselves that the BS&B Glycol Injection System, with Stabilizer, can give 50% increased recovery over standard two stage separation. All equipment was tested under identical production conditions . from the same number of wells and the same wells.

BS&B Glycol Injection System OF LOW TEMPERATURE SEPARATION WITH STABILIZER*

Tested and Proven to Give 50% Increased Recovery

RESULTS SHEET	Standard Two-Stage	Conventional Low Temperature Mechanical Three-Stage	Glycol Injection Low Temperature Separation With Stabilizer ††	
FREE WATER KNOCKOUT				
Pressure, psig		3200	3180	3180
HIGH PRESSURE SEPARATOR				
Pressure, psig	870	930	1090	1080
Temperature, °F	85	+20†	+20	−13
SALES GAS				
MMSCF/D (14.7 psia & 60°)	547	548	5.42	547
STOCK TANK				
°API Gravity	45.7	53.0	54.4	55.5
PRODUCTION				
BBLS/MMSCF Sales Gas @ 60°F from stock tank	11.6	14.4	16.4	17.4
Percent Increase in Recovery over Standard 2-Stage Operation	0	24%	41%	50%

† This was Lowest Temperature that could be obtained.

†† This run was made with the Low Temperature separator at exactly the same temperature as with the Mechanical Low Temperature Unit, in order to show the effect of stabilization.

See Our Exhibit OIL SHOW TULSA MAY 14-23

* Patented and Patents Pending

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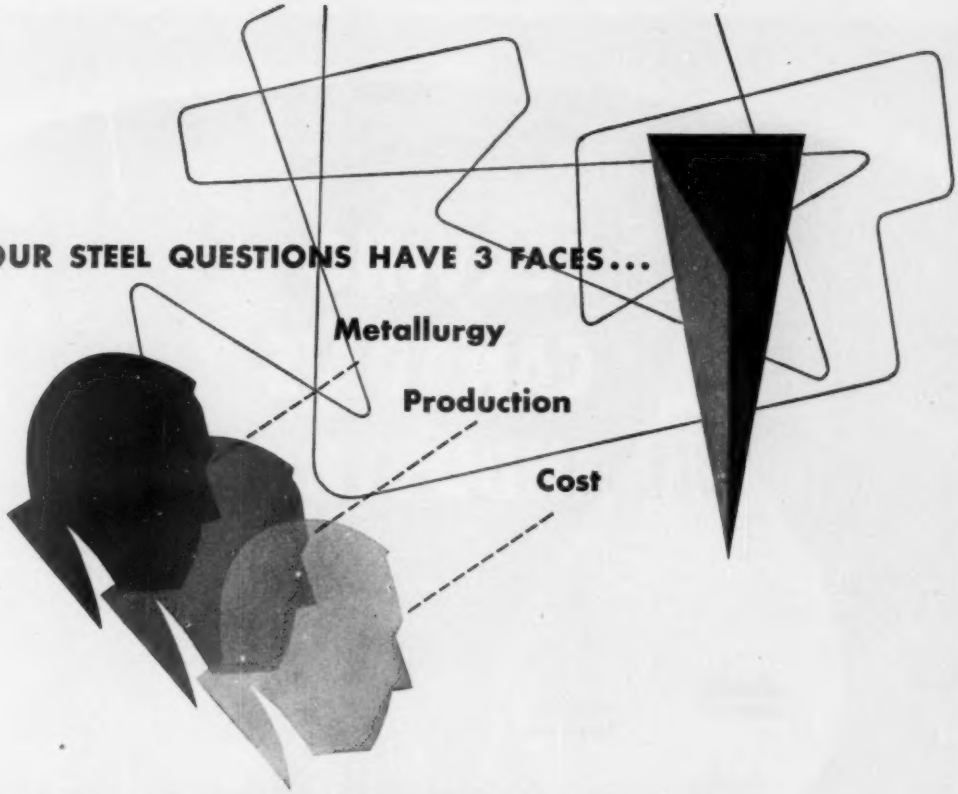

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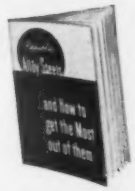

WRITE FOR this booklet of case histories on "Republic Alloy Steels, and How to Get the Most Out of Them."

LOOKS AT ALL THREE—Whatever you make . . . or plan to make . . . these 3 questions dictate your decision on steel grades. When leading fabricators, small or large, have any question about the right answer, they call in a Republic Field Metallurgist. They know that his final recommendations on alloys, machining, and heat-treating procedures will include the opinions of the other two members of the Republic 3-Dimension Metallurgical Service team . . . a Mill Metallurgist and a Laboratory Metallurgist.

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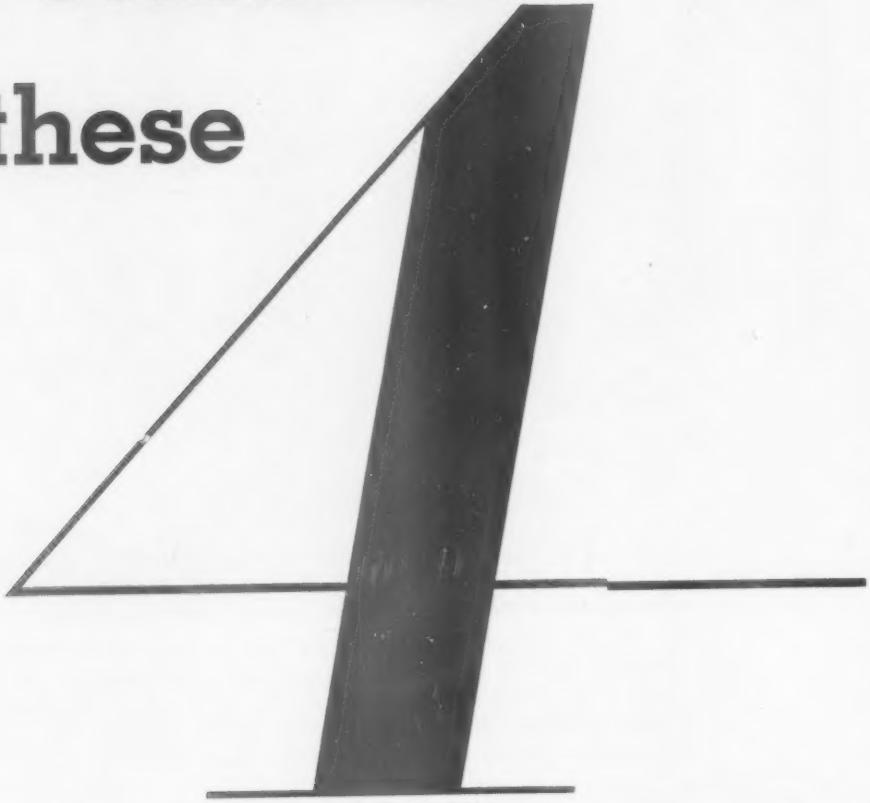

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1. high yield

The Atlantic Catforming Process was specially designed to produce high octanes at high yields. It properly balances all the many reactions necessary for the production of high octanes, assuring you of a high yield-octane relationship and maximum liquid recovery of high octane products from any feed stock.

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Catforming units can be designed by *your own* contractor, thus providing important economies and greater simplicity. Commercial units of from 750 to 12,000 BPD charge capacity are now being built at investment costs of only $250 to $400 per barrel. In operation, no feed preparation, product finishing or costly regeneration facilities are needed.

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Activity and selectivity of the Catforming catalyst are virtually unaffected by water, sulphur compounds, and nitrogen compounds normally encountered in naphtha reforming. Atlantic's catalyst has *proved* its ability to resist physical and chemical change.

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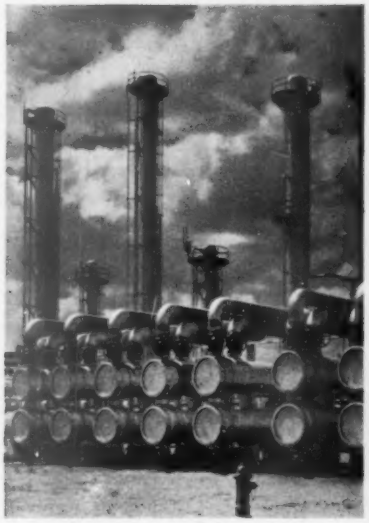

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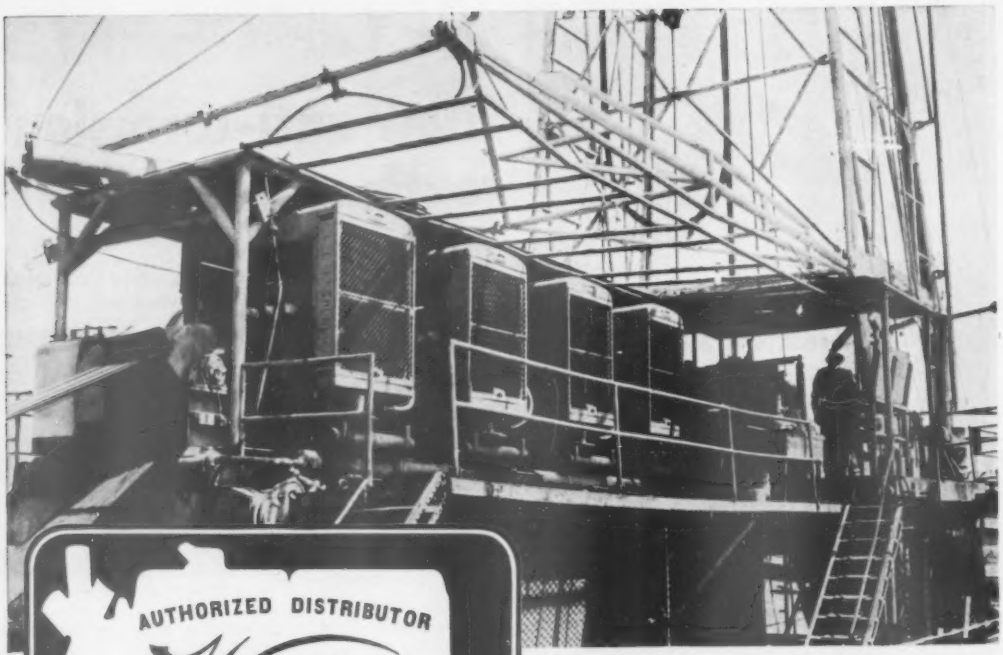

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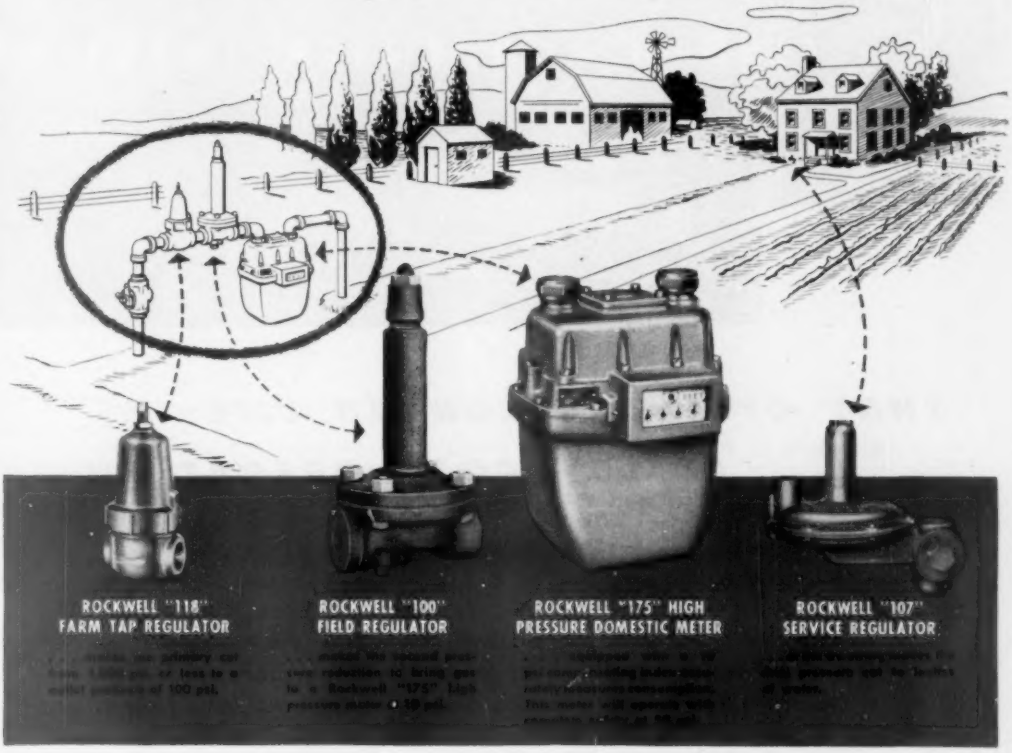
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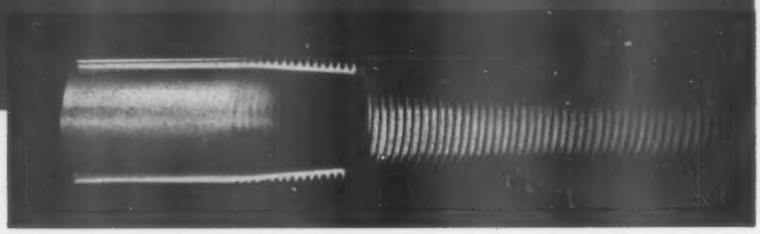
Come to Wolverine

for FINNED CONDENSER TUBES •



THAT GIVE YOU LONGER LIFE AT LOW-COST OPERATION

Illustrated above is a cut-away section of the unique Wolverine Trufin* showing the integral fin construction.

Note that the fins are formed from the wall of the tube. They are one and the same metal. Because of this all-one-piece construction, the fins will withstand vibration and sudden temperature changes.

The increased surface area provided by the smooth, clean surface of the fins allows liquids and gases to flow freely permitting the maximum in heat transfer efficiency.

Trufin is available in a wide range of sizes and alloys to meet your particular corrosion problems.

*REG. U. S. PAT. OFF.

Wolverine Trufin and the Wolverine Spun End Process available in Canada through the Unifin Tube Co., London, Ontario.

WOLVERINE TUBE DIVISION

of CALUMET & HECLA, INC.

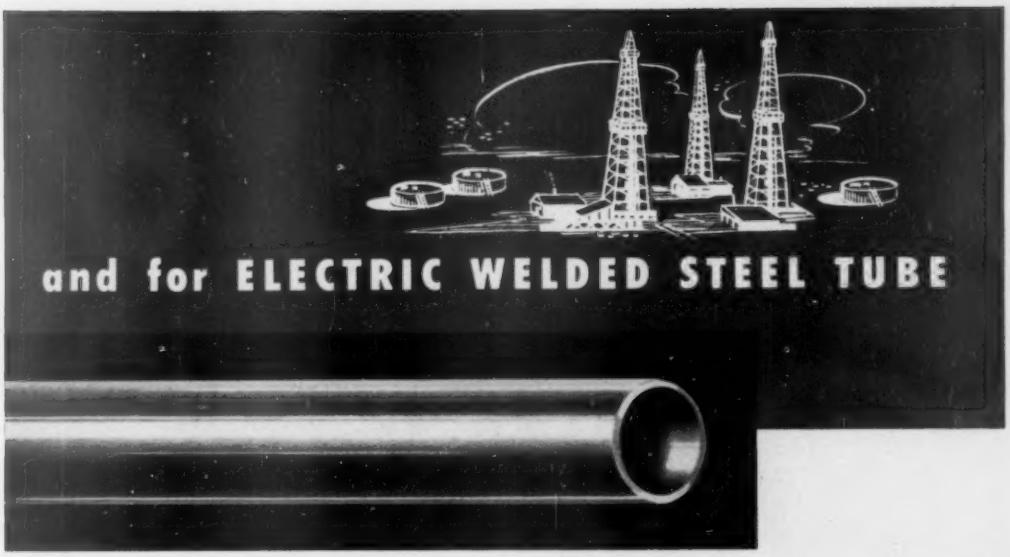
Manufacturers of Tubing Exclusively

1459 CENTRAL AVENUE • DETROIT 9, MICHIGAN

ESTABLISHED 1916

Plants in Detroit, Mich. & Decatur, Ala. *Sales offices in Principal Cities*

Export Department, 13 E. 40th St., New York 16, N. Y.



You can buy this electric welded steel tube with the same complete confidence you have associated with Wolverine nonferrous tube for nearly four decades.

You will get a product made by *tube specialists* and can take advantage of the many benefits that have accrued here during our 36 years' experience entirely devoted to the production, development and research of tube.

Wolverine electric welded steel tube is the product of continuous and concentrated research and development in the tubing field.

Look to Wolverine, as *tube specialists,* for help in selecting the proper tube and the most durable grade for your condenser, heat exchanger and boiler applications.

Available in O.D. sizes from ¼" to 3" and in the following analyses: SAE 1010, SAE 1015, SAE 1020, SAE 1025 and SAE 1030.

If you plan to attend the National Association of Corrosion Engineers Exposition, we'll be glad to have you visit our Booth 115-116.

ESTABLISHED 1916

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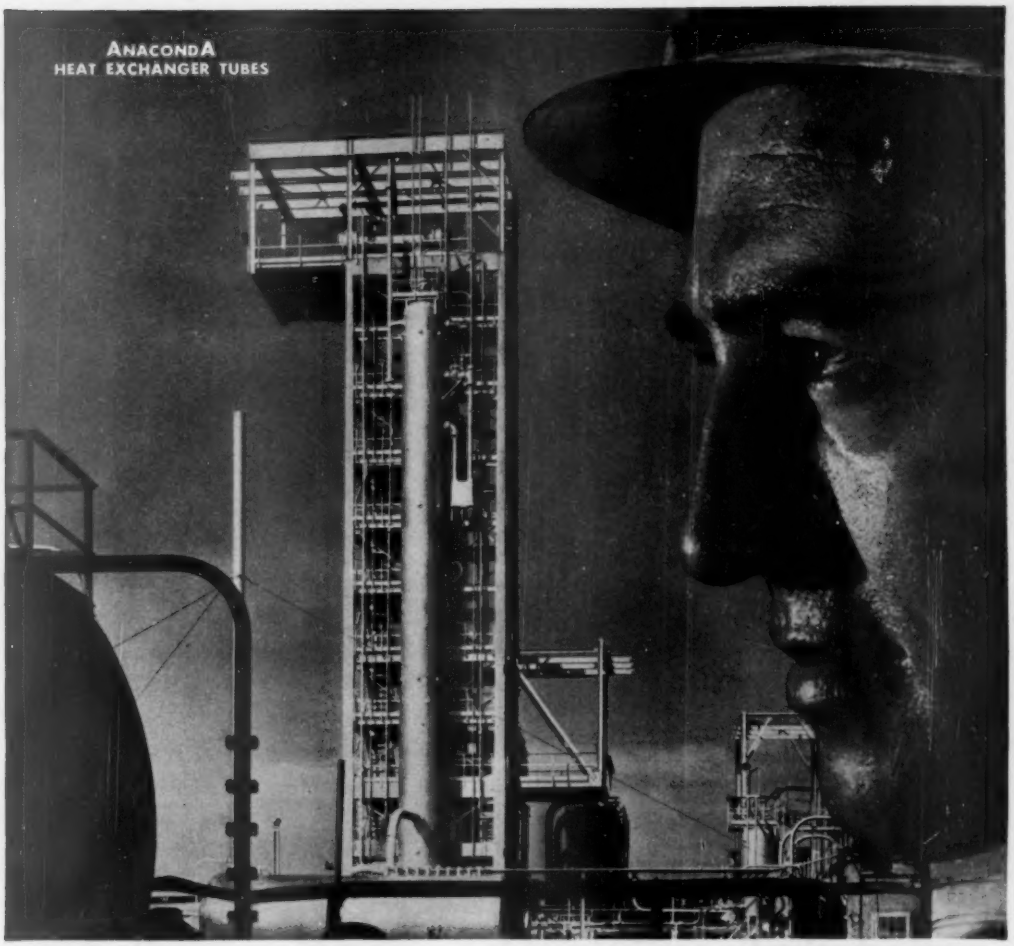
Export Department, 13 E. 40th St., New York 16, N. Y.

Powell Engineers always look to the future!
DEPENDABLE VALVES
SINCE 1846
POWELL
BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES



ARSENICAL ADMIRALTY-439:

OIL REFINER'S FAVORITE

WHERE oil refinery products handled by heat exchangers and condensers present no unusual problems of corrosion, high temperatures or high cooling water velocities, long experience indicates that tubes of Arsenical Admiralty-439 are the logical choice for satisfactory service life at economical cost.

This ANACONDA Tube Alloy offers good resistance to gas streams from both sweet and sour crudes and satisfactorily resists gases from sour crudes containing neutralizers. In addition, it is highly resistant to dezincification and, thus, can handle corrosive cooling waters at relatively high temperatures—a property which makes it definitely superior to non-arsenical Admiralty in most applications.

Whatever alloy best fits your operating conditions, choose it from the extensive line of ANACONDA Alloys for tubes and plate sheets. Our Technical Department's long experience in analyzing tube-performance problems is freely available to you. We have been working with copper and copper alloys for more than a century.

for efficient heat transfer

ANACONDA®
Heat Exchanger Tubes

The American Brass Company, Waterbury 20, Conn.
(In Canada: Anaconda American Brass, Ltd., New Toronto, Ontario)
Send me Publication B-2 "AnacondA Tubes and Plates for Condensers and Heat Exchangers"

NAME .....

COMPANY .....

STREET .....

CITY ..... ZONE ..... STATE .....

On varied field applications like these . . .

Johns-Manville

TRANTEX *polyvinyl* TAPE

gives lasting protection against pipeline corrosion!

ON JOB AFTER JOB, Johns-Manville Trantex Tape is controlling corrosion and extending the service life of underground gas and oil pipelines.

Trantex is a durable plastic tape that sticks on contact—bonds tightly to the pipeline. No heat or heavy duty equipment is needed in its application. It is easily applied by hand or by specially developed hand-operated machines. Many users have found that field-applied Trantex Tape speeds coating applications . . . lowers construction costs on both large diameter transmission lines and gas distribution systems.

Trantex Tape is a development of Johns-Manville—a pioneer in the manufacture of Asbestos Pipeline Felts. For further information about Trantex Tape, write for copy of PP-26A, Johns-Manville, Box 60, New York 16, N. Y.

	*V-10	**V-20
Dielectric Strength per mil thickness, Approx.	1,000 V	1,000 V
Insulation Resistance, greater than (ASTM-D-257-49)	100,000 megohms	100,000 megohms
Temperature Limit	200 F	200 F
Adhesion oz. per inch width	30	20
Tensile Strength lbs. per inch	30	56
Elongation at Break	250%	300%

"Trantex" is a black polyvinyl tape. It is available in two thicknesses—

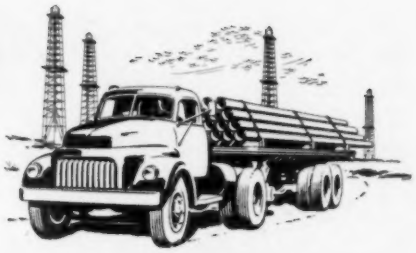
*V-10 is a 10 mil tape for average conditions, and

**V-20 is a 20 mil thickness for use where a more rugged coating is specified, such as to repair enamel coatings.

Johns-Manville TRANTEX *polyvinyl* TAPE

PROTECTS PIPELINES AGAINST CORROSION

Eaton 2-Speed Axle Trucks



More than a Million-and-a-Half in Trucks Today!

make more full-load trips, quicker, at lower cost

Quicker trips with no sacrifice of payload. Lower operating and maintenance cost, because engines operate in their best speed range. Less wear and strain on engine and vehicle. More miles in the life of the truck. Higher trade-in value. Eaton 2-Speed Axles will lower your hauling costs for you. Ask your truck dealer to prove it.

EATON AXLE DIVISION
MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

MOST SUCCESSFUL—MOST ACCESSIBLE MUD PUMP EVER BUILT!

350 Horsepower WHELAND

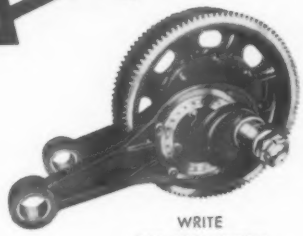
HP-14000 7½" x 14"

Discharge pressures at 60 R.P.M., 838 lbs. with 7½" liners; 1,627 lbs. with 5½" liners.

THE BIGGEST **14" PUMP** ON THE MARKET. . . . . ***WITH THE EXCLUSIVE WHELAND POWER END!***

PESA

One-piece alloy steel crank on Timken Roller Bearings. Heat treated alloy steel connecting rods assembled as an integral unit with NO CONNECTING ROD BOLTS and fitted to crank on American Roller Bearings. Tool steel helical gear and pinion, specially hardened. Ample size. Ample strength. Quiet. Free of vibration. This WHELAND pump has the guts to do the job!



WRITE FOR DESCRIPTIVE BULLETIN

DOMESTIC DISTRIBUTORS
Jones & Laughlin Steel Corporation Supply Division Tulsa, Oklahoma
Stores and Offices in all Principal Oil Fields and Centers

WHELAND

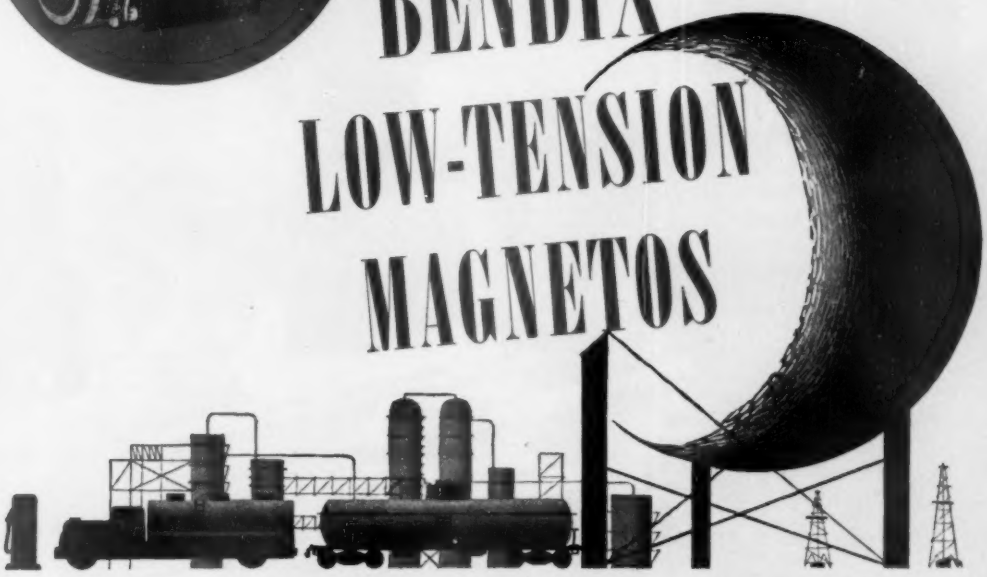
THE WHELAND COMPANY, CHATTANOOGA, TENN., U. S. A.
ROTARY DRILLING MACHINERY

EXPORT DISTRIBUTORS
Lucey Export Corporation
233 Broadway, New York 7, N. Y.
Broad Street House London E.C. 2, England

DRAW WORKS • SLUSH PUMPS • ROTARIES • SWIVELS • CROWN BLOCKS • TRAVELING BLOCKS

Designed for the Petroleum Industry—

BENDIX LOW-TENSION MAGNETOS



It's the magneto designed to eliminate fire hazard, foremost problem of the petroleum industry. The special ventilating arrangement of the Bendix Low-Tension Magneto permits air laden with explosive fumes to enter the magneto for ventilation without danger of igniting the surrounding air. Kits are also available to convert magnetos now in use to the "flame-proof" ventilation type.

In addition to this important safety feature, Bendix Low-Tension Magnetos actually reduce engine maintenance and operating costs. For example, spark plug erosion is reduced to a minimum. The distribution of low-tension voltage to the high-tension coils is through a series of breaker assemblies, thus eliminating trouble often experienced with the conventional distributor. Variable or fixed sparks can be obtained by internal adjustment.

For safety and low operating costs it will pay you to specify Bendix Low-Tension for all your magneto requirements. Complete data available on request.

- **Low Plug Erosion Rate**
- **Breaker Type Distributor**
- **Ventilation without Fire Hazard**
- **Radio Shielding Available**
- **Variable or Fixed Ignition**

Bendix

SCINTILLA MAGNETO DIVISION OF
SIDNEY, NEW YORK

AVIATION CORPORATION

Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, New York

FACTORY BRANCH OFFICES:
117 E. Providencia Avenue, Burbank, California • Stephenson Building, 6560 Cass Avenue, Detroit 2, Michigan
Brouwer Building, 176 W. Wisconsin Avenue, Milwaukee, Wisconsin • 582 Market Street, San Francisco 4, California

preventive

IDEAL

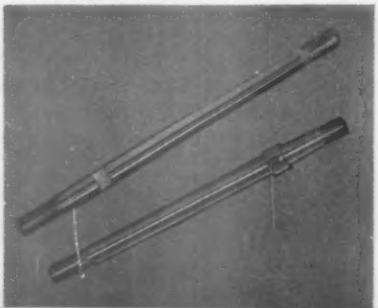
FLUID END PARTS

FOR SLUSH PUMPS

THE NATIONAL SUPPLY COMPANY
PITTSBURGH, PA., U.S.A.

Ideal "GT" Pistons: The long flexible rubber lips of the "GT" fluid piston assure positive sealing under pressure and permit proper lubrication at the same time.

Ideal "Blue-Stripe" Piston Rods "GT" or API Types: Recommended for high pressure work, "GT" Rod has shoulder feature to prevent movement of piston on rod . . . prevents creeping and bursting of piston cores. Standard API Rods meet requirements for wide interchangeability range. Both types also available in "Blue-Chrome" for corrosion resistance.



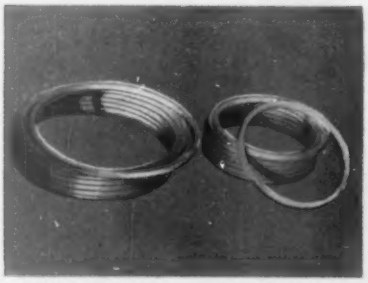
Ideal Type "G-1" Valves and Seats: Long, trou ble-free service is assured by Type "G-1" Valves an Seats designed to give maximum opening with shor lift. Absence of cross bars or webs permits full flui flow resulting in maximum pumping efficiency. Flui pressure seals resilient rubber disc against seat.

maintenance with IDEAL®

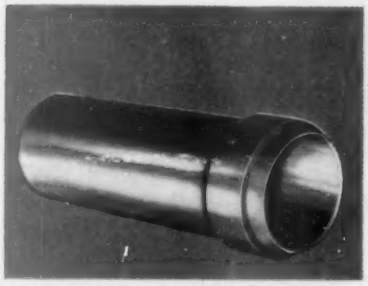
FLUID END PARTS

KEEPS SLUSH PUMPS IN TOP WORKING CONDITION

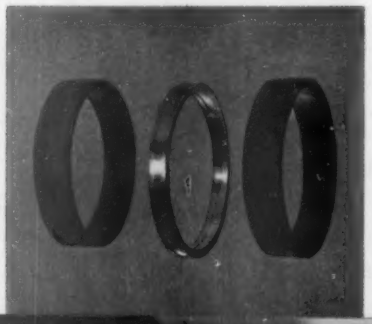
Ideal Cap and Head Gaskets: Made of long lasting material, are easily installed and seal better under pressure.



Ideal Fluid Cylinder Liners: Precision ground inside and out, "Nationaloy" Liners are finished to close tolerances and are highly resistant to wear. They fit closely in the pump . . . prevent fluid leakage and pump damage . . . reduce wear on pistons and rods due to misalignment. Also available with "Blue-Chrome" to prevent pitting, washing, and wear caused by corrosion.



Ideal Cylinder Liner Packing: Dependable packing units molded of oil, gas, heat and chemical resistant compound . . . provide a perfect seal between liner and pump bore. Each sleeve is hard enough to prevent excessive flowing and pinching . . . resilient enough for good sealing . . . carefully made for close fit.



Effective preventive maintenance is sure to pay off in maximum slush pump efficiency. And you'll find it worthwhile to specify "Ideal" Fluid End Parts as one means of reducing the cost of slush pump maintenance.

Of like importance are these three facts about "Ideal" Fluid End Parts—

- **They're carried in stock at every one of more than 100 National Supply Stores in the United States and Canada.**
- **They're made available in every major oil field throughout the world by the Export Division of National Supply.**
- **They're designed for use on pumps of other makes, as well as for "Ideal" Slush Pumps.**

That's why you'll always find it worthwhile to specify "Ideal" Fluid End Parts to maintain maximum slush pump efficiency at minimum cost through effective preventive maintenance.

PESA
PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION
PARTNERS IN PETROLEUM PROGRESS

NATIONAL BLUE PRODUCTS

THE NATIONAL SUPPLY COMPANY

PITTSBURGH 30, PENNSYLVANIA

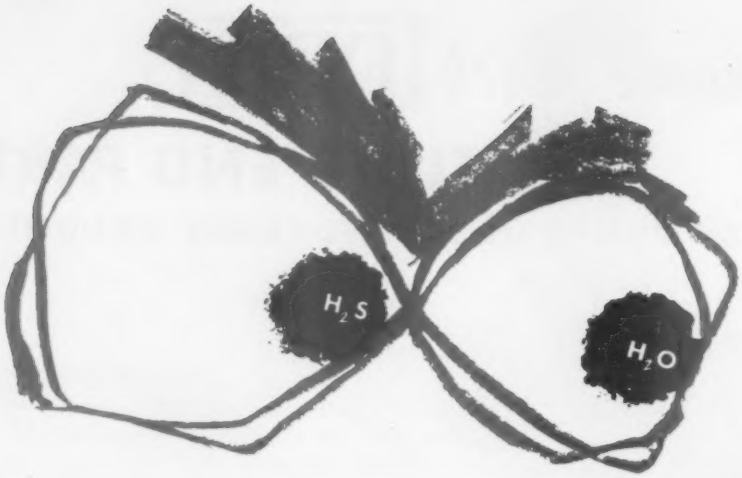
DIVISION OFFICES: Casper; Ft. Worth; Houston; Pittsburgh; Tulsa; Torrance

CANADA: The National Supply Company, Limited, 702 Barron Bldg., 610 Eighth Avenue, West, Calgary, Alberta

EXPORT: 600 Fifth Avenue, New York 20, N.Y., U.S.A.; River Plate House, 12 South Place, London, E. C. 2

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT

SPANG STEEL PIPE · SUPERIOR & ATLAS ENGINES



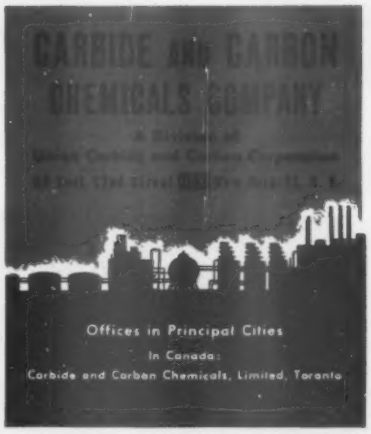
H_2S and H_2O need not cause you any Woe...

When you use	To remove
MONOETHANOLAMINE or DIETHANOLAMINE	H_2S
DIETHYLENE GLYCOL or TRIETHYLENE GLYCOL	H_2O

More corrosive hydrogen sulfide is being removed from hydrocarbon gases with monoethanolamine and diethanolamine than by any other method. Some companies are even realizing a profit from this impurity by converting it to elemental sulfur or selling it as concentrated H_2S.

And water can readily be removed from high pressure transmission lines with diethylene glycol and triethylene glycol. Thus you maintain capacity and avoid pipe line and regulator clogging.

Twenty years ago the introduction of monoethanolamine, diethanolamine, diethylene glycol, and triethylene glycol by Carbide and Carbon Chemicals made possible efficient and economical methods of removing H_2S and water from hydrocarbon gases. During this period we have compiled considerable data on the properties and use of these helpful chemicals. If you are constructing new facilities, or are replacing, enlarging, or modernizing your present equipment, we believe these data will save you time and money.

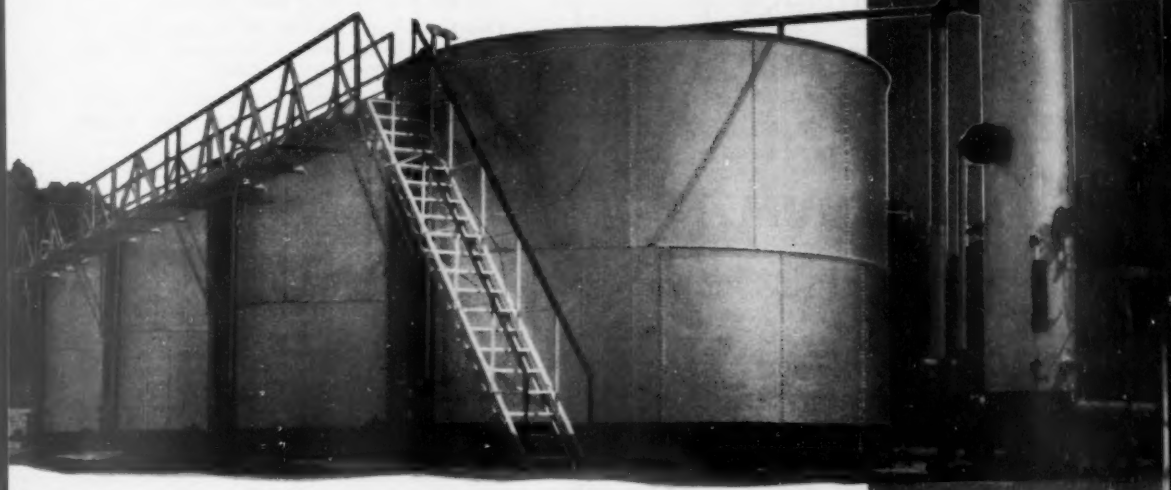

CARBIDE AND CARBON CHEMICALS COMPANY
Offices in Principal Cities
In Canada:
Carbide and Carbon Chemicals, Limited, Toronto

Get All 3 with BUTLER BOLTED STEEL OIL TANKS

★ **VERSATILITY** Your oil or refined petroleum products will be safely and economically stored in Butler Tanks. All tanks regularly supplied in your choice of two-coat, aluminum-finish coating or galvanized by the hot dip process. Aluminum decks are available for special applications. Capacities 100 to 10,000 barrels.

★ **DEPENDABILITY** Butler Tanks are built to API specifications. All parts are precision-formed to assure oil-tight construction . . . fast easy erection. Butler's half-century of experience in tank engineering and fabrication is your assurance that Butler Bolted Steel Oil Tanks are dependable.

★ **ECONOMY** Butler Tanks give you *extra* years of economical service for a more profitable long-term investment. Full thicknesses of steel, the finest of materials and expert fabrication save you time and money in erection and maintenance. The exact fit and bolted construction of Butler Tanks means they can be completely salvaged . . . easily moved . . . to provide many years of money-saving service.



You'll always get reliable service from your BUTLER distributor . . .

Your Butler distributor is ready to give you dependable, prompt service on Butler Bolted Steel Tanks, Walkways and Stairways, Loading Racks and other oil field equipment. To serve the immediate needs of any oil operation, Butler distributors maintain complete field service, including planning, erection, cutting down and re-erecting. Whatever your storage requirements, your Butler distributor will serve you better.

- **AMERICAN PIPE & SUPPLY CO.**
  - Casper, Wyoming
  - Denver, Colorado
  - Cut Bank, Montana
- **HARRY G. MILLER**
  - El Dorado, Arkansas
- **UNION TANK & SUPPLY CO.**
  - Great Bend, Kansas
  - Tulsa, Oklahoma
  - Oklahoma City, Oklahoma
  - Hobbs, New Mexico
  - Fort Worth, Texas
  - Houston, Texas
  - Odessa, Texas
  - Snyder, Texas
  - Alice, Texas
  - Tyler, Texas
  - Midland, Texas
  - Nocona, Texas
  - Abilene, Texas
  - LaFayette, Louisiana
  - Ruston, Louisiana
  - New Orleans, Louisiana
  - Casper, Wyoming
  - Powell, Wyoming
  - Glendive, Montana
  - Sterling, Colorado
  - Denver, Colorado

KANSAS CITY, MO.
Birmingham, Ala. — Richmond, Calif.
Galesburg, Ill. — Minneapolis, Minn.

BUTLER STEEL PRODUCTS

OIL EQUIPMENT — STEEL BUILDINGS
FARM EQUIPMENT — CLEANERS EQUIPMENT
SPECIAL PRODUCTS

Contact your Butler distributor today or write

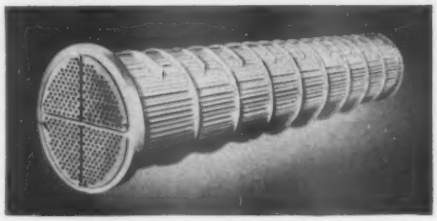
BUTLER MANUFACTURING COMPANY

7464 E. 13th St., Kansas City 26, Missouri
964 6th Ave., S.E., Minneapolis 14, Minnesota
Dept. 64, Richmond, California

Cut cost and corrosion in the process with

ALCOA ALUMINUM

- Heat Exchanger Tubes
- Pipe
- Storage Tanks
- Tank Cars



ALCOA ALUMINUM HEAT EXCHANGER TUBES

Check these BIG Heat Exchanger Tube savings:

Fabrication . . . Their ductility makes them easy to roll in and bend.

Shipping and handling . . . Completed bundles weigh far less than bundles of heavy metal tubes.

Cleaning . . . Require far less cleaning than Admiralty tubes in furfural service. Aluminum does not catalytically polymerize furfural.

Low Temperature Service . . . Strength actually increases as temperatures drop to –320° F and below.

Original Cost . . . Alcoa Aluminum Tubes cost 1/2 less than Admiralty, 1/3 less than Mild Steel, 1/5 as much as Stainless. An average-sized refinery can save $50,000 in first cost by using Alcoa Aluminum Tubes (figured on 20,000 tubes) as this chart shows:

PRICE PER 16 FOOT LONG TUBE

	⅝" O.D.x .049" wall	¾" O.D.x .049" wall	⅞" O.D.x .065" wall	1" O.D.x .065" wall
3S-H14	$1.17	$1.33	$1.62	$2.09
Alclad 3S-H14	1.49	1.73	2.04	2.69
Seamless Mild Steel	2.68	2.82	3.18	3.49
Admiralty Brass	2.95	3.53	4.39	6.10
Cupro Nickel (30%)	4.42	5.30	6.78	9.19
Stainless Steel (304)	8.61	9.67	11.38	13.73

Note: All prices are approximate. Prices for 3S-H14 and Alclad 3S-H14 based on lots of 2000-4999 lbs., for Admiralty and Cupro Nickel 5000 to 9999 lbs. Prices for Mild Steel and Stainless based on lots of 10,000 ft. with exception of size 1" O.D. x .065" wall which is based on 5000 ft.

Use Alcoa Alclad 3S-H14 Heat Exchanger Tubes with fresh, brackish and salt cooling waters.

Check These Heat Exchanger Tube Uses:

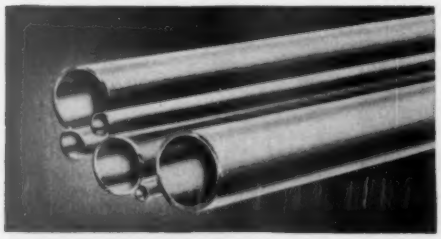
PETROLEUM

- Amine solution coolers
- Condensers handling hydrocarbon fractions from such processes as Thermal and Catalytic cracking, reforming, polymerizing, etc.
- Furfural condensers and heat exchangers
- Glycol-amine heat exchangers and reboilers
- Hydrogen sulfide gas coolers
- Jacket water coolers
- Lean oil—rich oil exchangers
- Lube oil coolers
- Natural gas compressor aftercoolers
- Propane chilling
- Recompressor aftercoolers
- Vapor recovery condensers
- Wax sweaters

CHEMICAL

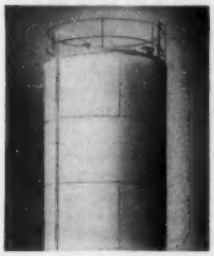
- Acetaldehyde
- Acetanilide
- Acetic acid
- Ammonia
- Benzene
- Butanol
- Butyric acid
- Dichlorobenzene
- Ethanol
- Ethylene Glycol
- Formaldehyde
- Furfural
- Gelatin
- Glycerin
- Hydroabietyl alcohol
- Hydrogen Cyanide
- Hydrogen Peroxide
- Isopropanol
- Methanol
- Naphtha
- Nitric acid (concentrated)
- Phenol
- Propylene Glycol
- Pyridine
- Ricinoleic acid
- Stearic, Palmitic, Maleic Oleic acids
- Turpentine
- Xylene
- and many others

Alcoa pioneered aluminum heat exchanger tubes 44 years ago. Write for details and the booklet: *Alcoa Aluminum Heat Exchanger Tubes.*



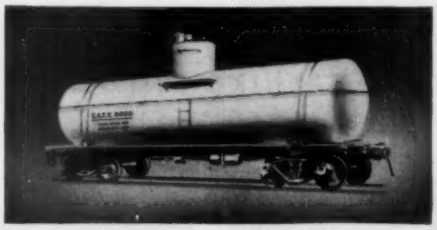
ALCOA ALUMINUM PIPE

Aluminum, of course, is highly resistant to attack by sour crude and most sulphur compounds . . . protects the quality of high-grade resin and other naval stores. It can be joined by every fusion process . . . is easier to handle and install because it weighs 1/3 as much as other materials. Its chemical inertness and corrosion resistance avoid batch and process contamination. High thermal conductivity and ductility speed filling of vessels with cold liquids. You get all these cost-cutting qualities when you use Alcoa Pipe in the processing field. Write for the booklet: *Alcoa Aluminum Pipe.*



ALCOA ALUMINUM STORAGE TANKS

For over 20 years Alcoa Aluminum has been in continuous service handling fatty acids in storage tanks. Aluminum protects the stability and color of essential oils, edible oils, fats, glycerine . . . resists the corrosive effects of sulphur . . . does not stain or discolor products handled . . . is nontoxic . . . inert to many chemicals . . . nonsparking. Write for the pamphlet: *Alcoa Aluminum in the Process Industries.*



ALCOA ALUMINUM TANK CARS

The first tank car of Alcoa Aluminum, in service since 1928, still hauls fatty acids . . . proof that aluminum resists corrosion, gives lasting service, doesn't contaminate its cargo. Leading shippers everywhere report: No damage to ladings . . . no damage to cars, when valuable liquids are delivered in Alcoa Aluminum Tank Cars. Ask your car builder about the advantages of lightweight aluminum rolling stock, or write to Alcoa.

ALUMINUM COMPANY OF AMERICA
904-B Alcoa Building, Pittsburgh 19, Pa.

For process chemicals—catalysts, catalyst carriers and desiccants—investigate ALCOA Chemicals

Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

Engineers

TO THE PETROLEUM INDUSTRY

- *Specialists in Surge Control in Gas and Air Piping*
- *Leaders in Engine and Compressor Noise Reduction*

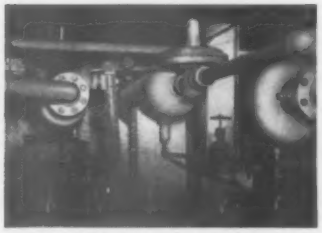
CONSULT BURGESS-MANNING ENGINEERS

As originators of the Snubbing Principle to reduce noises from engine exhausts and compressor intakes and a pioneer in surge control in gas and air piping, we are capably qualified by a quarter century of broad experience to serve you. Continuous, intensive research to improve the design of our Snubbers and diligent study of thousands of Burgess-Manning Snubber applications has kept us abreast of the tough, new operating problems in engine and compressor noise restriction and surge control confronting the petroleum industry. Consult Burgess-Manning, today: Sound engineering counsel, reliable Snubber design, a product manufactured to exacting specifications, guaranteed Snubber performance. Write for literature.

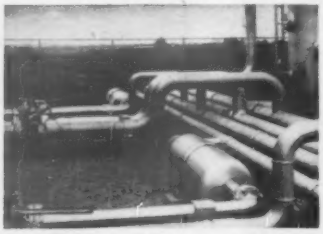
BURGESS-MANNING COMPANY

1203 Dragon Street, Dallas, Texas

FLUID CATALYTIC UNIT—A large size Burgess-Manning Snubber installed on flue gas blow off from regenerator on fluid catalytic unit of a Texas petroleum corporation.



SURGE CONTROL—Gas and Air Line Snubbers installed on the discharge of the first and high stage of a compressor.



GAS BOOSTER STATION—Burgess-Manning Snubbers installed in the high pressure discharge lines in a gas booster station.

GASOLINE PLANT—Burgess-Manning Exhaust Snubbers installed on 600 hp engines in an Oklahoma gasoline plant.

From well head through the refinery gate

...it's Burgess-Manning

Write for Bulletins

INSTALLATIONS

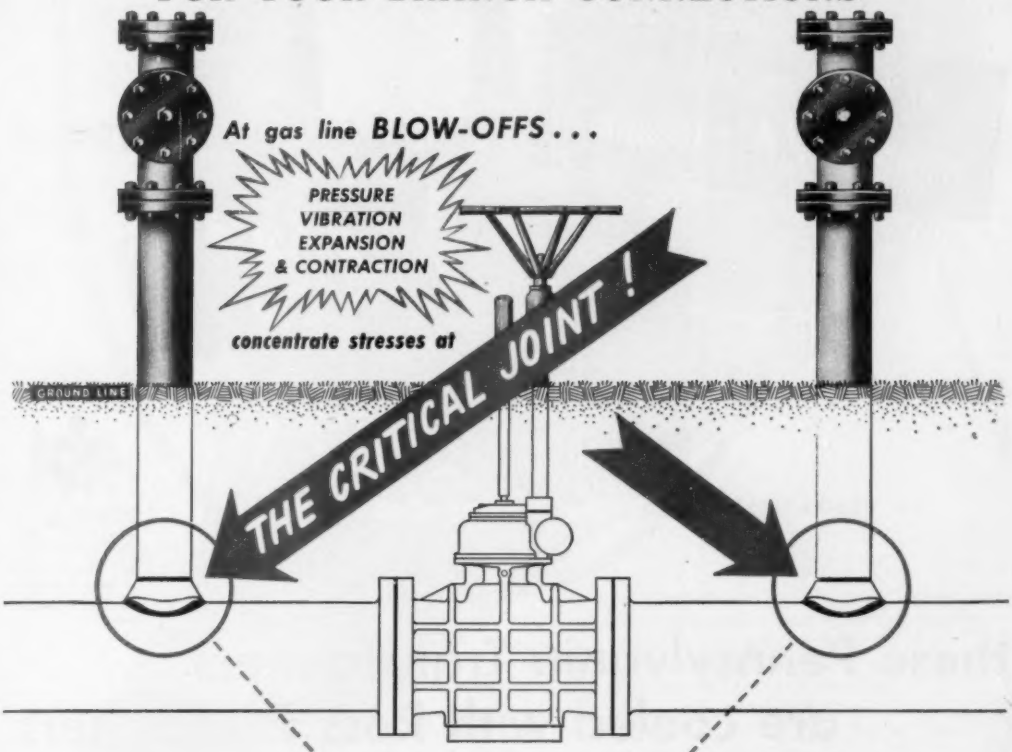
- Stationary and portable internal combustion engines
- Steam discharge
- Positive displacement and reciprocation vacuum pump discharge
- Compressors, blowers

PETROLEUM APPLICATIONS

Oil and gas production • oil and gas well repressuring and recycling • gas transmission • gas distribution • natural gasoline industry • manufactured gas industry • petroleum refining • petrochemical process industry • drilling • oil well pumping • crude oil and product pipe lines • chemical industry • all industries handling air, steam, refrigerants.

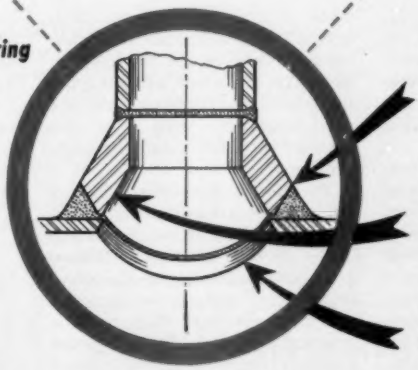
ENGINEERED REINFORCEMENT

FOR YOUR BRANCH CONNECTIONS



A big portion of your engineering job is done for you, if you...

Specify
BONNEY WELDOLET
Welding Fittings
to insure
permanent strength



Reinforcement where both the mechanical and internal stresses are most severe

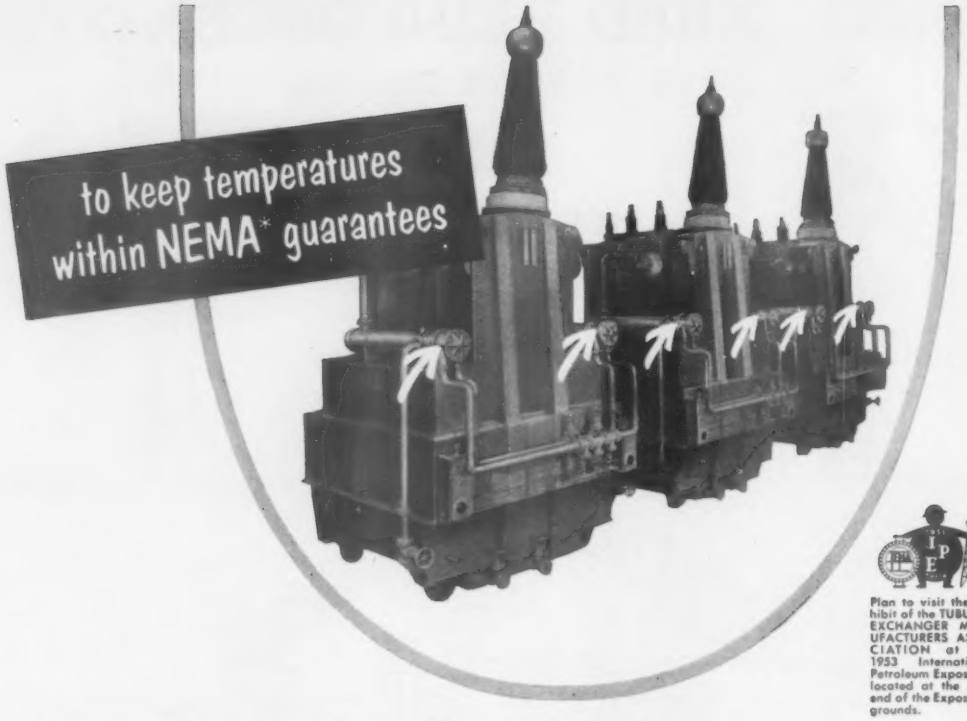
Funneled to relieve mechanical stress concentrations and improve fluid flow

Shaped and beveled for clean, quick and economical installations

FOR COMPLETE ENGINEERING DATA WRITE FOR YOUR BONNEY W3 WELDOLET CATALOG

DISTRIBUTORS IN PRINCIPAL CITIES

WELDING FITTINGS DIVISION
BONNEY FORGE & TOOL WORKS
ENG. DEPT., 366 GREEN STREET
ALLENTOWN, PENNSYLVANIA



Plan to visit the exhibit of the TUBULAR EXCHANGER MANUFACTURERS ASSOCIATION at the 1953 International Petroleum Exposition located at the East end of the Exposition grounds.

these Pennsylvania Transformers are cooled with Ross Exchangers

● This bank of three 29,000 Kva, 230,000-volt transformers is typical of many such high voltage power units which Pennsylvania Transformer Company, Canonsburg, Pa. furnishes to major industries and electric utilities.

To prevent transformer oil from reaching excessive temperatures, through heat generated in normal operation, each of these Pennsylvania units is equipped with two Ross Exchangers. Utilizing water as a coolant, their function is to receive the hot oil from the transformer, cool it as required, and return it for its job of maintaining the transformer temperature in accordance with NEMA guarantees.

Why have Pennsylvania's engineers selected Ross Exchangers for these applications? Among other things: "Ross equipment has many excellent features and the Ross organization has a fine background of manufacturing experience...has been very cooperative with us in connection with our heat exchanger problems".

The desire and competence of Ross engineers to consult in the solution of any heat exchange problem ...plus the wide adaptability of Ross fully standardized, pre-engineered designs and sizes, have earned a preference for Ross Exchangers in practically every field of application: engines, compressors, turbines, speed changers, hydraulic machinery and numerous others.

To be familiar with the principal Ross benefits, make sure you have the latest Ross literature. Request Bulletin 2.1K1 for information on the removable tube bundle Type CP Exchangers used on Pennsylvania Transformers, or Bulletin 1.1K5 on all-copper and copper alloy Type BCF units. Write.

KEWANEE-ROSS CORPORATION
DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION
1417 WEST AVENUE • BUFFALO 13, N. Y.
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Serving home and industry: AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS

BARRETT TECHNICAL SERVICE goes right down the line

to help you cut pipe-protection costs

Put your pipe-protection problems on Barrett's payroll. In the blue-print stage, call in a Barrett technical adviser. His advice and experience will help to determine the best protective coating to meet your specific requirements and conditions. Know *in advance* that costly pipe will get superior protection, giving you longer service for your investment.

The proper application of coal-tar enamels is essential. Draw on the experience of a Barrett technical representative for "over the ditch" advice until your pipe is *safely* underground. Barrett has field offices strategically located throughout the country. A Barrett field inspector can be at your pipeline site whenever needed.

For the best possible pipe protection and application supervision—be sure—specify Barrett!

Send for the Barrett Field Manual

A valuable 90-page source of information regarding detailed application procedures.

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*Reg. U.S. Pat. Off.

Four things line pipe men should remember: When you specify steel line pipe, always remember these four essential requirements:

1 Remember uniform quality. You are sure of this with Kaiser Steel line pipe, because it's produced by fully-integrated facilities, completely controlled at every step of production, rigidly tested before it's approved.

2 Remember dependable delivery. This is assured by Kaiser Steel in the western two-thirds of the United States. Every operation can be geared to meet your schedules *without* delay, because Kaiser Steel performs every step in pipe making, from raw materials mining to finished pipe fabrication.

3 Remember prompt service. Kaiser Steel men with long experience in working with the gas and oil industries stand ready to serve you whenever you say the word.

4 Remember wide range of sizes. Kaiser Steel pipe is produced in types and sizes to meet practically every requirement for petroleum, gas and water transmission.

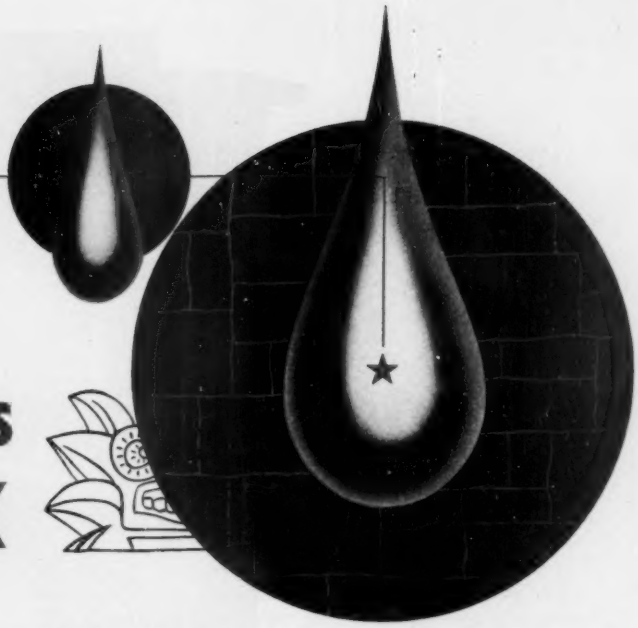
It's good business to do business with

Kaiser Steel

KAISER STEEL PIPE SPECIFICATIONS • All pipe manufactured to latest A.S.T.M. and A.P.I. specifications

Type	Diameter	Length	Wall Thickness	Shipping Point
Continuous Weld—Threaded and Coupled	½" to 4" nominal I.D.	Uniform 21'	Standard	Fontana, Calif.
Continuous Weld—Plain End	2⅜" to 4½" O.D.	Up to 40'	Standard	Fontana, Calif.
Electric Resistance and Fusion Weld—Plain End	8⅝" to 20" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser
Electric Resistance Weld—Plain End	5⅛" to 12¾" O.D.	Up to 55'	.188" to .375"	Fontana, Calif.
Electric Fusion Weld—Expanded—Plain End	22" to 30" O.D.	Up to 40'	.188" to .500"	Napa, Calif.—Basalt-Kaiser

Prompt, dependable delivery at competitive prices • **KAISER STEEL CORPORATION** Los Angeles, Oakland, Seattle, Portland, Houston, Tulsa, New York



HALLIBURTON'S POZMIX

SUPERIOR RESISTANCE TO CORROSION...

ELIMINATES THE WEAK LINK OF REGULAR PORTLAND CEMENT!

Calcium hydroxide, formed when a cement and water slurry hardens, is the open door for corrosive water. Pozmix *combines* with calcium hydroxide adding both strength and water seal tightness. You get superior resistance to corrosion during the entire lifetime of the well!

The many important and exclusive advantages of Halliburton's Pozmix include...

1. Lower density and lighter weight which minimize breakdown of soft formations... 2. Better protection for well casing... 3. Superior tensile and compressive strength... 4. Lower heat of hydration...

all with an actual saving in cost!

POZMIX SAVES MONEY IN EVERY WAY

Now in volume production, Pozmix is ready today to give you superior cementing. Contact your nearby Halliburton representative. Or write Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN OIL WELL CEMENTING

WHAT *Life-Line* REALLY DELIVERS IS MORE SERVICE... LESS SERVICING

Why this outdoor pumping equipment gives weather protection

Driving rainstorms, swirling dust, or blazing sun offers no problem to this protected pair.

OIL WELL PUMPING MOTOR. Notice the extra hoods on the motor. Ventilating openings are in the bottom halves. Inside, the brackets are mounted so ventilating openings are in the upper halves. Thus, entry of liquids is effectively avoided.

Inside, too, parts are extra protected, coils are wound of Tufvar® wire—wire you can pound with a sledge, tie into knots without disturbing the insulation. Complete stator is given multiple dips and bakes in tough Thermoset varnish. Bearings are pre-lubricated and factory sealed—need no further lubrication. In all, this pumping motor offers you more service with less servicing in any weather.

OIL WELL PUMPING CONTROL. This weatherproof enclosure completely protects this automatic pumping control. A time switch automatically takes care of cyclical pumping. The Life-Linestarter® with its simplified design provides positive overload protection through its snap action Bimetallic disc-type overload relay. "De-ion®" Circuit Breaker takes care of fault protection . . . eliminates single-phasing and maintenance problems common to other types of protection. Built-in lightning arrester dissipates lightning surges and static charges . . . protects both starter and motor. A complete unit to control your pumps.

Ask your Westinghouse representative to show you all the facts on these Life-Line motors and controls. Get a copy of "Electrified Oil Well Pumping", B-4039, and "Motors and Controls for the Petroleum Industry", B-5444. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21703-A

YOU CAN BE SURE...IF IT'S

Westinghouse

Industry comes to A. O. Smith with Heat Exchanger Problems

A.O.Smith

Your best source for

HIGH-PRESSURE

Heat Exchangers

• Three high-pressure heat exchangers are shown in the upper illustration. They are designed for 2400 psi on the tube side and have modified Bridgeman closures for channel covers.

• The lower illustration is a view of one of the above heat exchangers prior to completion. It shows detail of channel construction. The tube sheet was drilled by an A. O. Smith high-precision method to a degree of perfection far above accepted standards, to insure against leakage.

• • •

Here, at A. O. Smith, is a matchless combination of designing, engineering and fabricating skills, experience and equipment on which to draw in solving any heat exchanger problem. Dedicated to the search and development of better techniques, A. O. Smith engineers have created many "firsts" in the pressure-vessel and heat-exchanger fields.

For high-pressure service, the exclusive A. O. Smith MULTI-LAYER process was conceived and designed for constructing thick-walled vessels and exchangers. For reliable corrosive service at minimum cost, another exclusive was developed: the SMITHlining process of permanently bonding stainless or other materials to carbon plate.

These, plus a variety of other techniques in utilizing materials of all types, are implemented by complete fabricating facilities for producing equipment, fixtures and fittings. As a result, A.O. Smith engineers are able to develop the best solution of any heat-exchanger problem.

Proof of performance is obtained with A. O. Smith's own testing procedures. Full-scale vessels are tested to destruction at isolated test stations where pressures up to 50,000 psi can be applied. Materials are tested prior to fabrication in the company's chemical, physical, metallurgical and spectrographic laboratories.

Problems are resolved by research groups whose combined experience and accumulated data are without parallel. Closely associated are the experts in tool and fixture design who have their own unexcelled facilities.

For high-pressure or conventional heat exchangers, whether for chemical, petro-chemical, petroleum refining or power applications, A. O. Smith is your best source.

Your inquiry will receive prompt and expert handling.

A.O.Smith

VESSELS • HEAT EXCHANGERS

Chicago 4 • Cleveland 15 • Dallas 2 • Denver 2 • Houston 2
Los Angeles 22 • Midland 5, Texas • New Orleans 12 • New York 17
Pittsburgh 19 • San Francisco 4 • Seattle 1 • Tulsa 3
Washington 6, D.C.

International Division: Milwaukee 1

We put 30 years of work into this pin

You've seen plenty of service pins. You may wear one yourself indicating five, ten, twenty-five years of service with your company.

But the pin you see illustrated here is a different kind of pin. We had it made to symbolize thirty years of special service—not to any one company—but to the entire petroleum industry. For it was just thirty years ago—on February 2, 1923—that the first gallon of "Ethyl" gasoline was sold to a motorist and the long list of Ethyl services was started.

We believe this thirty years of experience is one of the most important ingredients in Ethyl antiknock service. For while one pound of antiknock compound may be very much like another—its value to the refiner depends largely on how it is used. From the very beginning, Ethyl has had as its principal objective not

(*Continued on next page*)

Printed in U.S.A.

We put 30 years of work into this pin

(*Continued from preceding page*)

only the efficient manufacture of a product, but the development of services which would help our customers get the most out of that product.

That's why for example, Ethyl has carried out an intensive year-in, year-out advertising and sales-promotion program to promote the premium-gasoline market. That's why we set up the Ethyl Research Laboratories and a network of gasoline testing laboratories. That's why Ethyl pioneered a wide variety of programs, not only in the passenger-car market, but in the bus, truck and farm-tractor fields as well. That's why Ethyl offers numerous safety services, dealer-education programs and technological helps to refiners.

These services are doubly valuable because the men who bring them to you have many years of personal experience. Many of our people wear service pins indicating five, ten and twenty-five years of working with Ethyl for the petroleum industry.

ETHYL CORPORATION

NEW YORK 17, NEW YORK

Ethyl service is backed by 30 years of antiknock experience

RESEARCH

SALES HELPS

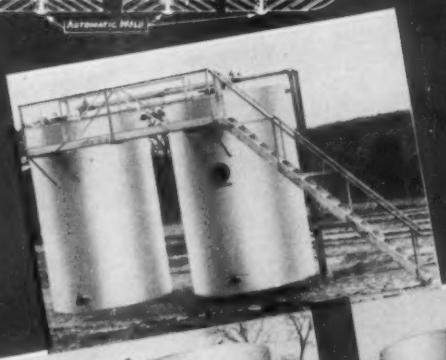
SUPPLY SERVICE

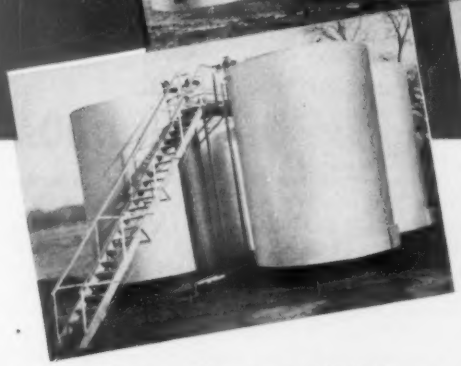
ROAD TESTING

TECHNICAL REPORTS

GASOLINE TESTING

It's the WELD that makes M-C Welded Steel Tanks SUPERIOR





New steel *plus* welding by the shielded arc process (under rigid supervision), *plus* hydrostatic testing to insure each tank against leaks makes Maloney-Crawford BOLTED steel tanks SUPERIOR. Variety of sizes and capacities available with cone or flat bottoms or with aluminum decks.

- ★ **Full Automatic Welded**
- ★ **Flanged Decks and Bottoms**
- ★ **Hydrostatically Tested**
- ★ **P and M or Customer's Specifications**
- ★ **Trained crews available in Mid-Continent area to unload, upend, and align tanks and to erect walkways.**

MALONEY CRAWFORD

MALONEY-CRAWFORD TANK & MFG. CO.

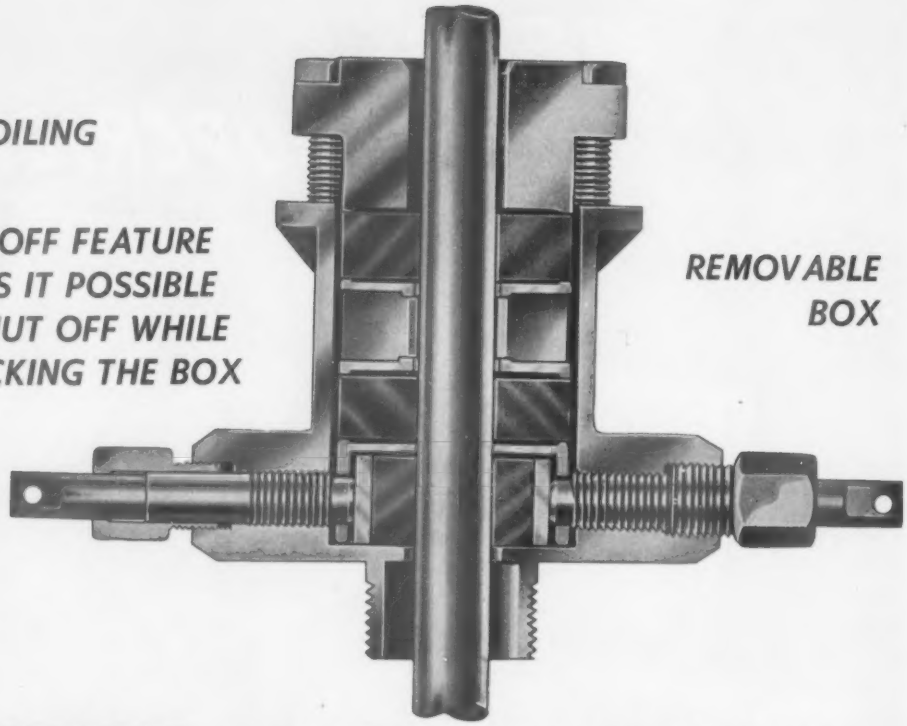
See Us at
TULSA MAY 14-23

FACTORY AND GENERAL OFFICE: 38 North Peoria—Box 659—Tulsa, Oklahoma.
EXPORT REPRESENTATIVE: Baird Lines, 420 Lexington Avenue, New York, N. Y.
CANADIAN REPRESENTATIVE: Maloney-Crawford of Canada, Ltd., 810 Lancaster Bldg., Calgary.
TEXAS PANHANDLE REPRESENTATIVE: Atlas Tank Co., Pampa, Texas.

SELF-OILING

SHUT-OFF FEATURE MAKES IT POSSIBLE TO SHUT OFF WHILE REPACKING THE BOX

REMOVABLE BOX



A Good Combination

. . . the Ratigan #176-1B Lubricating cap working as a team with the #176 Stuffing Box (shown above). The cap lubricates the polished rod when the flow of oil in the tubing is retarded, and the self-oiling stuffing box lubricates the polished rod with oil from the well when the well is not heading.

RATIGAN No. 176 STUFFING BOX

. . . is the only self-oiling unit on the market today, receiving lubrication directly from the pumping well.

Ratigan No. 176 Stuffing Box greatly increases the safety and efficiency of oil field service. It is made of high grade electric steel and tested to 3,000 pounds pressure. The inside of the box is removable, so that the device has two oil chambers. Another arrangement inside the body keeps these chambers filled with fluid from the well, providing positive self-lubrication without depending on the human element.

The No. 176 has a shut-off feature which enables the operator to shut off while repacking the box . . . simply tighten the screws evenly in the shut-off. Caution must be exercised however, as the screws will have to be loosened before the well starts to pump. If not, the fluid will not get up into the stuffing box. The hole in the rubber is the size of the polished rod, while the hole in the metal parts of the body is larger, making the rod self-aligning . . . an important feature.

When the screws are not tight against the rubber, the stuffing box is free to function properly. For a further check on the fluid coming up through the bypass, the pumper may loosen the plug in the cap a little, and if the bypass is free the oil will flow immediately. If the oil does not come through, the screws in the shut-off are too tight. When repacking, both rubbers must be renewed. Specify size and type of thread, and size of polished rod when ordering.

Ratigan Products Are Illustrated and Described In The Latest Edition of The Composite Catalog.

J. P. RATIGAN, INC.

1213 Santa Fe Avenue, Los Angeles 21, Calif.

Export: National Supply Company, Inc., Export Division, 600 5th Avenue, New York 20, N. Y.

RATIGAN PRODUCTS ARE SOLD BY LEADING SUPPLY STORES EVERYWHERE

ANOTHER *Electric Power* CASE HISTORY

HYDRAULIC UNIT USES Low Cost Purchased

Electric Power

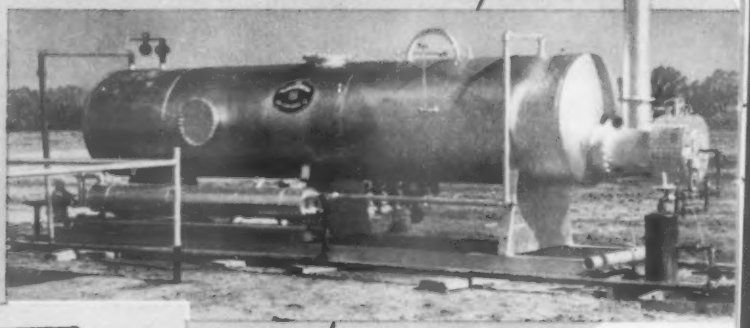
ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

Our 25th Year

Petroleum Electric Power Association

North, South, East or West the switch is to •PEP in '53

These Multiple Advantages



• are YOURS only with

PARKERSBURG
Horizontal Emulsion Treaters

LESS TURBULENCE

Maximum initial separation takes place when emulsion enters the treater. This separated gas, as well as additional gas liberated in the heating process, passes *above* instead of through the settling emulsion, thus assuring the least possible turbulence.

LARGER FLUME SECTION

The flume and pre-heater section is considerably larger than in other horizontal treaters. When emulsion enters treater it spreads in thinnest possible layer over this large flume plate to release all possible gas. Emulsion flows downward very slowly to obtain exceptionally high rate of heat exchange.

GROUND LEVEL HOOK-UP

Parkersburg Horizontal Treaters are shipped completely assembled, including heat exchanger and unitized valves. Only three ground level flow connections are required to hook-up the treater. This frequently saves over $200.00 on installation costs.

CONSTANT HEAT EXCHANGE

The heat exchanger is filled with liquid at all times, assuring constant heat exchange regardless of flow rates. Greater velocity through this unit assures maximum heat transfer.

No. 5304

PARKERSBURG
PRESSURE EQUIPMENT

HORIZONTAL AND VERTICAL SEPARATORS • HYRECO • HYDRACEPTER • SCRUBBERS • TREATERS • HEATERS

Manufactured in Houston, Texas

Every drum of

PITT CHEM

Modified Enamel

Measures up to Written Specifications

You don't have to buy a single drum of Pitt Chem Modified Enamel to recognize its uniform top quality. Just check its specifications . . . softening point . . . penetration . . . ash, etc., and you'll *know* that an enamel that meets these rigid standards *has* to give you top performance, in application and in service.

Ton after ton, these impervious enamels perform uniformly within specifications. Pitt Chem Modified Enamel consistently heats up faster, flows better from kettle to pipe, coats more pipe per day and stands up to a wide range of temperature conditions. And, thanks to this same PITT CHEM *quality-insurance,* you can't beat this tough, durable enamel for downright, long-lasting protection. ● We'll gladly supply you with technical data on request. Write today!

W&D 4447

- Standard Grade Tar Base Enamel
- Modified Grade Tar Base Enamel
- Plasticized Grade Tar Base Enamel
- Cold Applied Tar Base Coatings

PROTECTIVE COATINGS DIVISION

PITTSBURGH

COKE & CHEMICAL CO.

Grant Building · Pittsburgh 19, Pa.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON

Photo—Oil & Gas Jnl.

'round-the-clock

PROTECTION

Here are conduit fittings and lighting fixtures designed to provide day-and-night protection against the arcs that touch off disastrous fires and explosions in oil refineries, petrochemical plants, pipeline stations, natural gas processing plants . . . any area where flammable vapors or gases may be present.

Engineered to completely confine the dangerous sparks that lurk in wiring systems, Appleton Explosion-Proof equipment is easy to install and service. And among the hundreds of fittings and fixtures in the complete Appleton Line is an explosion-proof fitting exactly suited to your needs.

No matter what your lighting or wiring problems, Appleton engineers have the background and knowledge to help you to a practical and economical solution. For the finest electrical fittings and fixtures—explosion-proof or otherwise—specify Appleton, supplier to American builders for nearly half a century.

Type FSQX Explosion-Proof and Dust-Tight Plug and Receptacle with interlocking safety switch. →

The Appleton Seal-Line Switch Unilet is a combination switch housing and sealing unit. Completely explosion-proof without additional sealing fittings.
Pat. No. 2,208,558

APPLETON
Explosion-Proof
Equipment

Safety and service features of the Appleton Type EFU Explosion-Proof Fluorescent Lighting Fixtures make them foremost in design of fluorescent lighting for hazardous locations.
Pat. No. 2,392,202

Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY
1718 Wellington Avenue • Chicago 13, Illinois
Sales Engineers in All Principal Markets

APPLETON
CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

They Say—

Moot Point

Sir:

We have been discussing your use of the word "moot" (page 183, last line, January 26 issue).

I was inclined to agree with your use, but others around here, backed up by Webster's, argue that the word means "a subject for discussion," rather than "no longer a subject for discussion." Webster gives the latter as archaic, but the former as preferred present meaning.

P. F. Clement
Gulf Research & Development Co.
Pittsburgh.

Editor's note: Webster's latest edition doesn't even list the "no longer a subject for discussion" definition. Our international editor and our gentlemen on the news desk have been asked please to quit appearing archaic.

United Nations Criticized

"The (nationalization of resources) resolution does not contain a word in defense of private enterprise. It does not mention the rights of private investors who have risked their savings in the development of such resources. It says nothing about the sanctity of contracts or the long-established principles of international law. It deprecates any action by a member state to uphold the rights of its nationals against the confiscation of investments made in good faith.

"It is unfortunate that this action has come at a time when the need for large-scale international investment and the obstacles to it are exceptionally great."

The Guaranty Survey, published by Guaranty Trust Co., New York.

Dark Spots on Oil's Horizon

"Among the chief possible deterrents to the building of petroleum reserves in the Southwest today, I would list these:

"1. Prices arbitrarily depressed by governmental action.

"2. Excessive tax drains.

"3. Interference with managerial freedom of private enterprises.

"We witnessed a recent committee action of the United Nations where approval was given for the nationalization of any country's natural resources. Remember, too, the lone dissenting

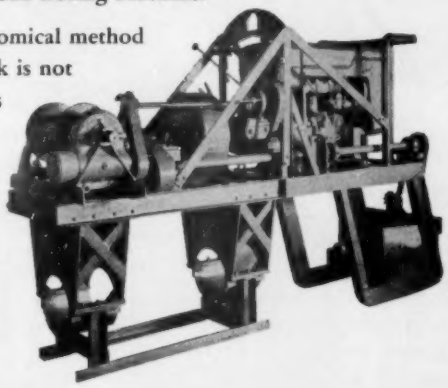
. . . is the right way to bore Crossings!

CROSE

Auger-Type ROAD BORING MACHINE . . .

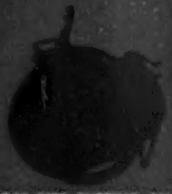
You don't have to stop traffic to install pipe casing under Highways or Railroads, when you do the job with the Crose Auger-Type Road Boring Machine.

It is the fastest and most economical method of boring crossings where rock is not encountered. Installs casing as boring progresses—eliminates cave-ins. Absolutely prevents settling of concrete slab highways or railroad beds. Extremely accurate in alignment. Adaptable to all sizes of casing from 3" to 34".



CROSE LINE-TRAVELING CLEANING AND PRIMING MACHINE

CROSE LINE-TRAVELING COATING & WRAPPING MACHINE



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vote on this action was by the United States representative who unsuccessfully attempted to at least require compensation and deemphasize nationalization as a development policy.

"Even within this country there have been recurring bills and investigations aimed at nationalization of oil through the establishment of a 'national oil policy.' We have already had a taste of the deteriorating effect on development of oil reserves by forces at work in the so-called tidelands situation. Trends such as these are the black spots on an otherwise encouraging horizon for development of the Southwest as a vital locale for the country's industrial strength."

Frank M. Porter, president, American Petroleum Institute, addressing the Executive Development Course, Agricultural and Mechanical College of Texas, College Station.

FTC's Corrigans

"Nothing could be more fundamental to really competitive business than the right of one competitor to meet another competitor's lower prices in an effort to retain a customer. But the three majority (FTC) commissioners, who insist on being the 'wrong-way Corrigans' on the Government anti-trust team, are determined to put real competition in a straightjacket at all costs.

"If these three commissioners were interested in maintaining a vigorous competitive system, they would do all in their power to encourage the meeting of competition since it is so fundamental to free enterprise."

Thomas Sunderland, general counsel of Standard Oil Co. (Ind.)

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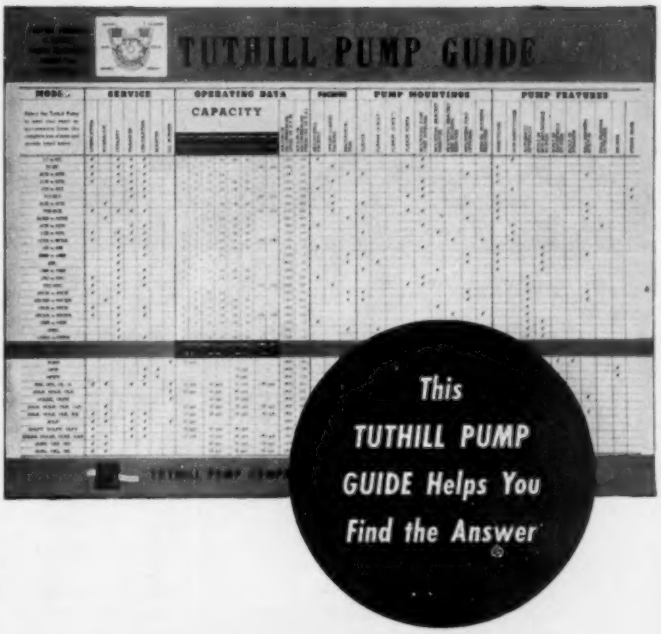
"The only additional service that I think of that would be of special use to the busy engineer would be the printing of bibliographies of technical articles that appear in other periodicals, but I do not know if this would be considered ethical from the standpoint of the technical press.

Cecil M. Cooper,
equipment inspector
El Segundo refinery
Standard Oil Co. of California
Los Angeles.

NEW EASY WAY TO SELECT THE RIGHT PUMP FOR THE JOB



To save you time and trouble in selecting the pump best-suited to your application, Tuthill engineers have developed this revolutionary new Pump Guide. Here, in one easy-to-use chart, is a volume-full of information on the complete line of Tuthill Pumps.

At a glance, it shows you the services for which each model is built, together with performance characteristics, types of packing, mounting styles and distinctive features that enable you to fit the pump to your need, rather than the need to the pump.

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Mr. Hall, speaking from firsthand knowledge, says, "on pipeline work you can't beat a Carco winch for efficiency, power and long life."

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WINCHES FOR ALL INDUSTRIAL TRACTORS

CARCO

CALENDAR

FEB.

27 Natural Gasoline Association of America, regional meeting, Scharbauer Hotel, Midland, Tex.

MAR.

2- 6 American Society for Testing Materials, spring meeting, Statler Hotel, Detroit.

3- 4 Symposium on subsurface geology, University of Oklahoma.

4- 6 American Petroleum Institute, division of production, Southwestern district spring meeting, Hilton Hotel, Fort Worth.

4- 6 National Association of Corrosion Engineers, Tulsa section, fourth annual short course for pipeliners, Mayo Hotel.

8-11 American Institute of Chemical Engineers, Buena Vista Hotel, Biloxi, Miss.

15-20 American Chemical Society, petroleum division, spring meeting, Statler Hotel, Los Angeles.

16-20 National Association of Corrosion Engineers, ninth annual conference and exhibition, Hotel Sherman, Chicago.

18-20 American Petroleum Institute, division of production, Mid-Continent district meeting, Mayo Hotel, Tulsa.

23-25 Western Petroleum Refiners Association, annual meeting, Plaza Hotel, San Antonio, Tex.

23-26 American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, and Society of Exploration Geophysicists, joint annual meeting, Sam Houston Coliseum, Houston.

23-27 Western Metal Exposition and Congress, technical sessions, Statler Hotel, Los Angeles.

25-27 Society of Automotive Engineers, national production meeting, Hotel Statler, Cleveland.

28 North Texas Oil and Gas Association, annual meeting, Kemp Hotel, Wichita Falls, Tex.

30-31 Texas Independent Producers and Royalty Owners Association, annual meeting, San Antonio.

Apr. 1 Mid-West Gas Association, Broadmoor Hotel, Colorado Springs, Colo.

7- 8 American Gas Association, research and utilization conference, Hotel Statler, Cleveland.

7- 9 Petroleum Industry Electrical Association, annual convention and exhibit, Shamrock Hotel, Houston.

8-10 American Petroleum Institute, division of production, Eastern district meeting, William Penn Hotel, Pittsburgh.

15-17 National Petroleum Association, midyear meeting, Cleveland.

20-22 American Petroleum Institute, Division of Transportation, products pipe-line conference, Hotel Muehlebach, Kansas City.

21 Association of Consulting Chemists and Chemical Engineers, Inc., Hotel Belmont Plaza, New York City, symposium and dinner.

21-23 Southwestern Gas Measurement Short Course University of Oklahoma, Norman.

22-24 American Association of Petroleum Geologists, Rocky Mountain section meeting, Casper, Wyo.

24-25 Interstate Oil Compact Commission, spring meeting, Roosevelt Hotel, New Orleans.

26-29 American Institute of Chemical Engi-

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2. THE STRING SHOT BACK-OFF

1 The Dia-Log Free Point Indicator indicates electronically the deepest point to which *both* torque and stretch can be applied in a string of stuck oil well pipe. Both torque and stretch readings are essential since left-hand torque is always used in subsequent back-off recovery operations.

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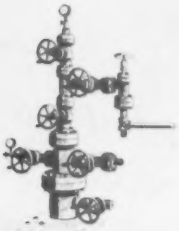

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neers, Chemical Institute of Canada, joint meeting, Royal York Hotel, Toronto, Ont.

27-28 Independent Petroleum Association of America, mid-year meeting, Jefferson Hotel, St. Louis.

Apr. 29-May 1 Natural Gasoline Association of America, annual convention, Rice Hotel, Houston.

Apr. 30-May 1 American Gas Association, transmission and storage conference, Edgewater Beach Hotel, Chicago.

MAY

4- 5 American Petroleum Institute, division of marketing, midyear meeting, Baker Hotel, Dallas.

5- 6 Gas hydrate control conference, University of Oklahoma, Norman.

6- 8 American Society of Training Directors, ninth annual conference, Sheraton Plaza Hotel, Boston.

7- 8 American Petroleum Institute, Rocky Mountain district, Division of Production, spring meeting, Gladstone Hotel, Casper.

11-13 Southern Gas Association, Jung Hotel, New Orleans.

11-14 American Petroleum Institute, Division of Refining, midyear meeting, New York.

13-14 Pacific Coast Gas Association, annual gas supply and transmission conference, Santa Barbara, Calif.

14-23 International Petroleum Exposition, Tulsa.

15-16 International Gas Union, council meeting, Paris, France.

24-27 American Gas Association, production and chemical conference, Hotel New Yorker, New York City.

25-29 American Society of Mechanical Engineers, annual conference and exhibit, oil and gas power division, Hotel Schroeder, Milwaukee.

27-29 Texas College of Arts and Industries, Kingsville, eighth annual short course in gas technology.

28-29 Western Petroleum Refiners Association, regional technical-industrial relations meeting, Broadview Hotel, Wichita.

28-29 Natural Gas and Petroleum Association of Canada, London, Ont.

28-30 West Texas Geological Society, annual field trip, Marfa, Tex.

JUNE

2- 3 American Petroleum Institute, Division of Production, Pacific Coast District, Statler Hotel, Los Angeles.

4- 5 Kentucky Oil and Gas Association, annual meeting, Lafayette Hotel, Lexington, Ky.

7-12 Society of Automotive Engineers, summer meeting, The Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.

14-18 Canadian Gas Association, Windsor Hotel, Montreal, Canada.

15-19 American Petroleum Institute, Division of Production, midyear committee conference, Hotel William Penn, Pittsburgh.

16-19 American Welding Society, national spring technical meeting, Shamrock Hotel, Houston.

18-19 Western Petroleum Refiners Association, regional technical-industrial relations meeting, Conrad Hilton Hotel, Chicago.

18-19 Pennsylvania Grade Crude Oil Association, annual meeting, Hotel William Penn, Pittsburgh.

JUNE 29-JULY 3 American Society for Testing Materials, annual meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

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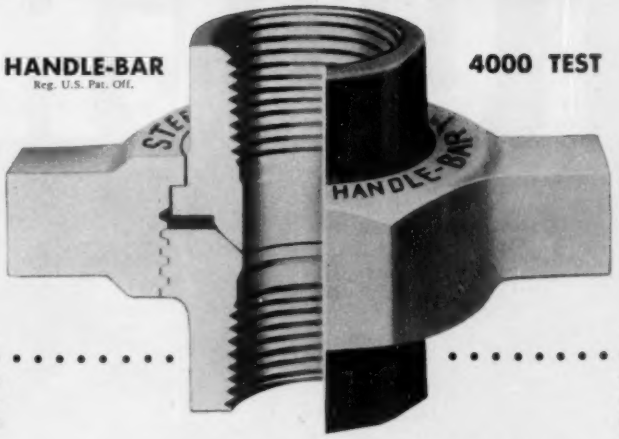
Reg. U.S. Pat. Off.

4000 TEST



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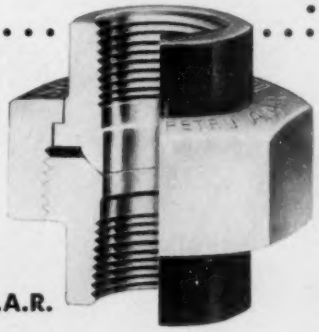

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TULSA, OKLAHOMA

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JOURNALLY Speaking

Silence, Please

A COUPLE of weeks ago our favorite oil publication printed a piece about pumping oil with sound out in California — a new kind of pump which uses infrasonic waves too short for the human ear to detect.

That was fine so far as it went, but this department feels behoven to add to our readers' store of learning on the subject of silent sound. First, be advised that the human ear detects only sound waves between 20 and 20,000 cycles per second—which is a range almost high enough for a coloratura soprano. Any infrasonic or ultrasonic waves, below or above the audible range, can be used by industry for many purposes, but the engineers will have to stay in their own ends of the spectrum or else they will infringe on man's inalienable right to try to find a little silence.

In spite of this limitation, silent sound is getting a lot of attention from researchers, and is being tried out on a jillion uses. Not only can silent sound pump oil wells, but it is being experimented with to increase oil production by vibrating the oil-bearing formation and jarring — or scaring—the crude into the wells. Still other experiments are aimed at using these silent vibrations to drill oil wells.

But that's not all. Silent sound is being used in laboratory research to accomplish a vast variety of jobs for industry, such as: Pack loose sand in solid foundations, jar dirt out of clothes and dye into fabrics, age whiskey, detect flaws in metal, sterilize foods, drill square holes, knock soot out of factory smoke, and jar rheumatism out of aged joints.

A sound research program, we say.

Management Reading

WE seldom get such a flood of requests for reprints as has been pouring in for extra copies on Engineers and Management which appeared in our issue of January 19.

These short and fast-moving articles on How to Meet the Engineering Shortage and What Management Expects from Its Engineers really hit a responsive chord. We have received requests for hundreds of reprints—single copies and bulk orders, from people in all branches and occupations in the petroleum industry and from all over the country and some foreign countries.

Another article of the same general nature appears in this issue, and it's called The A.B.C.'s of Supervision. Reprints will also be available—single copies free, bulk orders at printing cost. Just drop a note to our Readers' Service Department.

Reader Service

WE will go to considerable lengths to please our readers, but we have to draw the line some place. One subscriber in particular is entirely too demanding.

A year or so ago when this man was abroad he asked us to airmail him the table of contents and the classified section each week and throw away the rest of the magazine. This sounded like a dirty dig at our editors, who labor hard to put something worth while between those two features every week. (We, personally, were incensed that he considered the table of contents better reading than this page.)

Now, back in the United States, he comes forward with another dilly. He wants his copy of the Big Yellow Book sent to him without staples, so he can clip it easier. At least he's progressed to the point where he thinks that some of the pages of editorial material might be worth glancing at, but we're not about to issue a loose-leaf edition just to make it easier for people to throw away big hunks of our pride and joy. What does he think we write all that stuff for, anyway? Next thing, he'll be wanting ring binders.

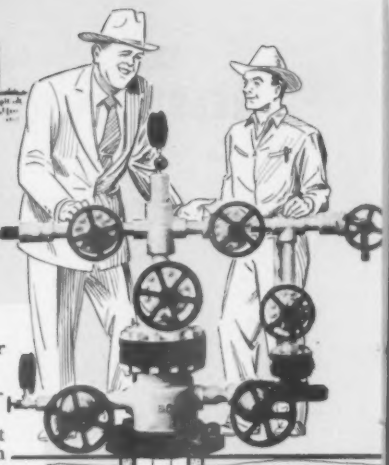
We figure we're not running any risk of making this guy sore by gigging him this way because—obviously—he's the type who'll never read this page.

Henry D. Ralph.

a well-side chat

about "permanent" installations of

BAKER RETAINER PRODUCTION PACKERS



(SETTING) *Melvin Matthews, Baker Branch Manager, chats with an operator in the Magnolia Field in Southern Arkansas, who has a number of wells ready to go on the pump.*

(TIME) *December, 1952.*

Operator: What experience have you had with Baker Packers in *this* field?

Matthews: Well, we just finished setting a Baker Packer in *this* well.

Operator: What do you mean? This well has been on production for ten years.

Matthews: You're right. A Baker Model "B" Packer was run in on tubing and set in December, 1942. At that time the well had a bottom-hole pressure of 3,750 psi.

Operator: You mean the packer has been in all that time and held up for ten years?

Matthews: That's right, for 10 years. You know Baker claims that their packers are for "permanent" installations, and I guess when a packer stands up for ten years with that differential across it that's "permanent" enough, and mighty good performance.

Operator: Sure sounds "permanent" enough for me. By the way, how many Baker Packers are in this field anyway?

Matthews: Well, I don't know exactly how many were set to start with, but there are 31 I can think of right off hand that were set in 1942 and are still operating perfectly.

Operator: Man, that's a lot of packers in one field like this. Will the new packer you just set in this well be good for another ten years?

Matthews: It will probably be good for 20 years, because it was the new "D-4" packer, and they should easily last twice as long.

Operator: What makes you think that?

Matthews: Well, there are a number of reasons. In the first place the packers set here in 1942 had the seal in the packer and it couldn't be repaired. With the new "D-4" the seals are on the Tubing Seal Nipple which is part of the tubing string, and when the seals need repairing you just pull the tubing, install new seals on the Baker Tubing Seal Nipple and run in again.

Operator: That sounds like a real improvement.

Matthews: Yes, it was, but that's just part of it. With wells getting deeper and both pressures and temperatures higher, the new Baker Packers have lead seals to back up the resilient packing element, and then we put in malleable iron rings to back up the lead seals. Our Engineering Department found that when things got really tough the resilient packing element wouldn't stand up by itself, and even the lead would give way sometimes under extreme conditions. So, we backed up the lead with malleable iron rings—and believe me, that did it.

Operator: Sounds like you *could* be right about that new packer lasting 20 years. But what about drilling out the packer if you have to go on the pump?

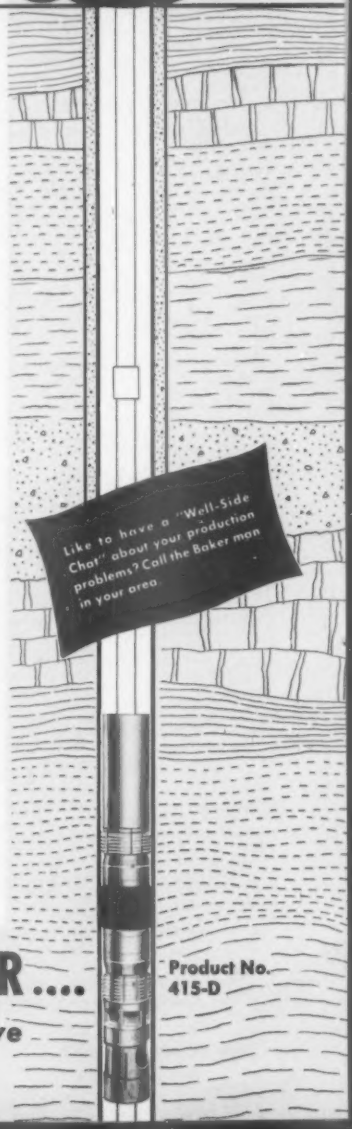
Matthews: No trouble at all. The new packer is just as drillable as the old type was, and operators around here know that *it* drills up easily because they've had to drill 'em when the wells finally quit and had to be put on the pump.

Operator: Well, I guess you're right about "permanent" installations. If a packer holds out until the well quits and you have to put her on the pump, that should be "permanent" enough to satisfy anybody.

■

The Baker Retainer Production Packer has so many other advantages besides being "permanent" that you ought to know all about it. You should know how it can be set on a wire line (as well as on tubing or drill pipe)—how it virtually becomes part of the casing, leaving the tubing free to be run or pulled as often as necessary—how you can produce two zones separately and simultaneously.

There's a new issue of Baker Equipment News on the subject of "Dual Zone Completion Practices" which is well worth your study. Ask any Baker representative or office for your copy.



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HOUSTON • LOS ANGELES • NEW YORK

BAKER RETAINER PRODUCTION PACKER....

Product No. 415-D

Available through any Baker office or representative

Exit OPS, enter imports as the oil-price villain

THE freeze of oil prices that the petroleum industry has complained about for more than 2 years is about to be lifted. Now operators must look to the law of supply and demand for any changes in prices of crude or products.

And there is little in the present market situation to support a general increase in prices. On the contrary, there are factors which suggest that prices may go down. The market for many products is softening, output is high, and stocks are above normal.

Crude producers who have been clamoring for higher prices apparently are in for a disappointment. Undoubtedly the price of crude is too low, considering present costs of exploration, drilling, and producing. Sooner or later crude prices must go up, but it looks as though this will be later rather than sooner.

NO longer can producers "blame the Government" for their plight. A well-documented brief on replacement costs will get even less consideration from an oversaturated market than it did from the Office of Price Stabilization.

The price of crude depends on the price of products, and as long as product prices are weakened by oversupply there can be no general increase in crude prices. And as long as plenty of crude is available at refineries, refinery runs will stay high, at least over a considerable period. So the price of crude depends on its supply in relation to product demand, and at present that ratio is on the high side.

THE new villain, of course, will be foreign oil. Imports are high, they have been rising, and the trend is upward. Domestic producers blame excessive imports for the oversupply which threatens to be a price depressant. They have considerable justification for this belief.

Within rather narrow limits the production of crude in this country can be regulated by conservation authorities to maintain an approximate balance between supply and demand, a balance which benefits both producers and consumers. But this regulator is futile when the volume of imports far exceeds the amount of flexibility in domestic production.

PRACTICALLY everyone is agreed that imports should "supplement but not supplant" domestic production. The argument comes over the demarcation between these two conditions. But regardless of arguments, the facts of supply and demand strongly indicate that imports are a big factor in the present softness of so much of the petroleum market.

There is no easy answer to the imports problem. But it takes no special prophecy to foresee that it will soon be the most hotly discussed subject in the oil industry.

MEMO From the Boss-Man
TO My overworked Assistant;
Go fishing for a couple of weeks-
I've turned all our Marketing
problems to Anchor-When you
come back you can return to
refining instead of trying to
be a salesman too—
then
I'm going fishing
JB

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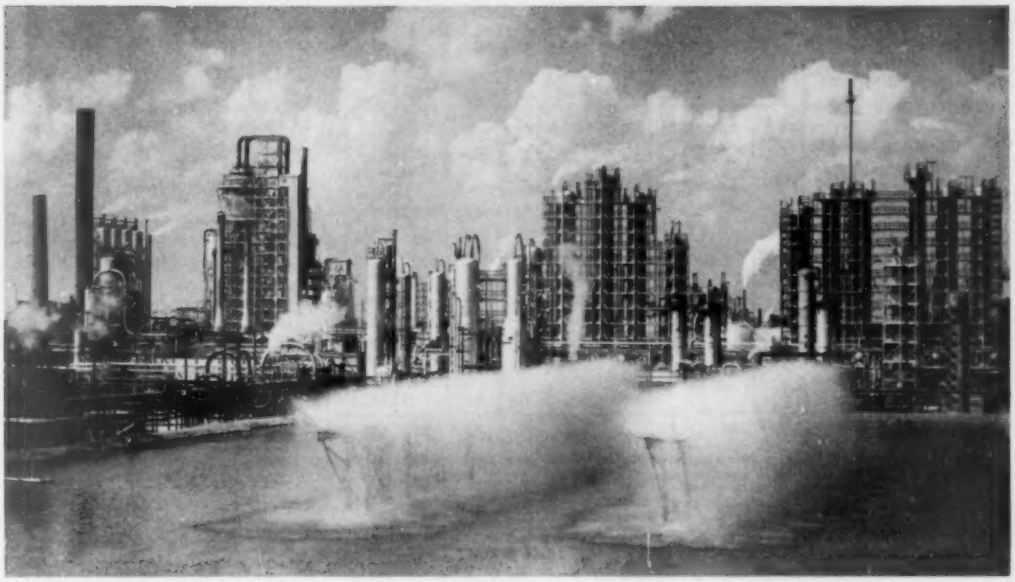
THIS WEEK



WATER—AND LOTS OF IT—is required to keep a refinery on stream, and particularly so in one the size of the 292,000-bbl. refinery of Humble Oil & Refining Co. at Baytown, Tex. Some of the processing units of this big Gulf Coast processing center provide the background for this scenic shot of a spray pond, where the water is cooled for reuse in the processing facilities.

INTERNATIONAL.—Survey shows 636 rigs now operating in non-Communist areas outside the United States and Canada. . . . Figure is 15 per cent higher than big year of 1948 but up only slightly from mid-1952. . . . ¶Jersey Standard cuts 12 cents a barrel off price of Middle East crude oil. . . . Drop in price credited to continued low tanker rates. . . . ¶Two more small Italian tankers leave Genoa for Abadan to load Iranian oil. . . . Anglo-Iranian still expected to take court action against first such ship, the Miriella, which is expected to dock shortly in Genoa. . . . ¶Kent refinery of Anglo-Iranian and Coryton refinery of Vacuum Oil Co. damaged by recent floods in western Europe. . . . ¶International Petroleum brings in its third Totumal well in Colombia as a 400-bbl. producer. . . .

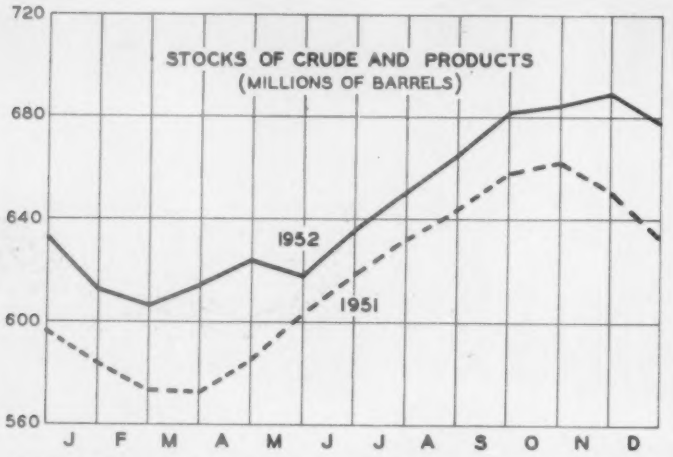
TRENDS.—Refinery runs decreased each week of the 5-week period ended February 7 for a total drop of 387,000 bbl. daily. . . . Despite these decreases, runs averaged 432,000 bbl. daily more for past 6 weeks than for same period a year ago. . . . Major product stocks were reduced only 15,772,000 bbl. in the past 6 weeks compared with a reduction of 21,332,000 bbl. in the same weeks last winter. . . .

ACTIVITY.—Production of crude and lease condensate averaged 6,534,900 bbl. daily for week ended February 7, up 17,525 bbl. daily. . . . ¶Total well completions were up 6 wells for the week to 861. . . . ¶Wildcat completions dropped 30 wells to 196. . . . ¶Rotary rigs operating in United States on February 9 totaled 2,536 compared with 2,463 a week earlier and 2,680 on the corresponding date last year. . . .

PRICES.—Study indicates oil prices generally will not rise when controls go off at the end of April. . . . Some increases expected, but these are seen as being confined to specific products and on a local basis. . . . Reasons given are these: stocks are high, crude is plentiful, warm weather has cut demand. . . . Also, export demand is off and imports are high. . . . Exception to general rule will be California, where prices are expected to rise to a higher level, at least until Trans Mountain line is completed. . . .

EXPLORATION.—Interior Department approves agreement between Phillips and Northern Development providing for 12-well exploration program on million-acre block of leases in southern Alaska. . . . Agreement provides Phillips must spend minimum of $1,200,000 by mid-1956 and $400,000 yearly after that. . . . ¶Northern Pacific announces it has leased two blocks totaling 16,000 acres in Williston basin to Stanolind with provision for 30 per cent royalty. . . . Another lease concluded with Cities Service covering nearly 4,000 acres outside basin in Montana. . . .

PIPE LINES.—PAD reveals 289,026 tons of line pipe will be available for construction of crude and products lines during the second quarter. . . . Six projects, five of them products lines, to receive priorities assistance for first time. . . . ¶Platte Pipe Line buys 91-mile, 8-in. crude outlet from Wind River basin area of Wyoming from Service Pipe Line. . . . ¶Pasotex Pipe Line completes 200-mile, 8-in. crude line from Wink to El Paso. . . . ¶P. G. & E. starts construction of four loops totaling 86 miles on its big-inch gas line from a connection with El Paso on the California-Arizona border. . . .



PLENTY OF OIL . . . There is little chance of general shortages or price increases as long as stocks of crude oil and refined products remain as high as in recent months.

Oil Prices Won't Rise

When controls go off there will be some adjustments, but they'll be local in nature; markets now are not too firm

John C. Casper

WILL oil prices go up when federal price controls are removed at the end of April?

A study of the factors involved indicates that they will not—except possibly on a few products in certain regions due to local conditions.

Many people seem to have the impression that petroleum prices are bumping against ceilings and that removal of controls will result in substantial price increases. This is due largely to the fact that there are pending applications for higher ceilings for both crude oil and refined products on the West Coast and for Pennsylvania Grade crude oil, plus a recent actual increase granted to correct an abnormal situation in fuel oil on the East Coast.

These are local situations, and are not representative of the condition in the industry as a whole. The fact is that the only major petroleum product in short supply today is military-grade aviation gasoline.

When price ceilings are removed, prices will be determined by supply and demand for petroleum products and by the free play of the market forces. If a product is in short supply in some areas, its price tends to rise there until more supplies are made available, whereas surpluses tend to depress prices. Thus without fixed ceilings, prices will fluctuate more, but the general level will not necessarily increase.

After April, according to present plans of the Eisenhower administration, petroleum prices will be determined by supply and demand. Let's look at the principal factors in the supply-and-demand picture.

January was tip-off . . . For example, take the actual performance in January, as revealed in preliminary figures of the month just closed:

Total demand (roughly equivalent to consumption plus exports) for all petroleum products in January was about 8,630,000 bbl. daily. New supply averaged about 8,280,000 bbl. daily—made up of 6,500,000 bbl. of domestic crude production, 650,000 bbl. of natural-gas liquids, and 1,130,000 bbl. of imported crude and products.

This left a deficit of 350,000 bbl. daily, which was taken out of stocks. On the face of it, this looks like a shortage. But it isn't, because stocks are always drawn down in January, and usually to a greater extent.

In past years, total demand for the entire first quarter has averaged nearly 10 per cent less than total demand in January. Even allowing for the possibility of colder weather in February and March, demand for the first quarter may average slightly less than 8,000,000 bbl. daily compared with most forecasts of about 8,500,000 bbl. daily, based on normal weather conditions.

Weather is warm . . . Warmer-than-normal weather has cut fuel demands. The averages of daily mean temperatures in 14 selected cities in the northeastern and north-central states indicate that weather for these areas has been about 8 per cent warmer than normal in the September-January period.

If the weather averages out over the year to be about normal, domestic demand may be up as much as 5 per cent over last year.

Exports are off . . . Export demands are expected to be down about 20 to 25 per cent from the average for 1952.

Early 1952 export demand was boosted by the inability of foreign refineries to meet the increased load brought about by the loss of production at Abadan, Iran. Since that time, increased refinery capacity, mostly in Europe, has taken most of the market formerly supplied from Abadan. Very little of the United States export demand is now due to the Iranian dispute.

Thus, the outlook for total demand in 1953 is for an increase of less than 3.5 per cent.

Imports are high . . . Preliminary reports indicate that imports averaged more than 1,100,000 bbl. daily in January. Heavy fuel imports are higher during the winter months, but even a normal seasonal decline during the warmer months will not bring the year's average below 1,000,000 bbl. daily. There is nothing to indicate that there will be any lessening of the pressure from foreign crude and products for a market in this country.

If the Iranian dispute is settled, there will be additional crude and products hunting for a market in world trade.

Crude is abundant . . . If imports for 1953 average about 1,000,000 bbl. daily, the forecast demand for the year can be met with crude production of about 6,350,000 bbl. daily and 636,000 bbl. daily of natural-gas liquids. Crude production in January averaged about 6,500,000 bbl. daily, and Texas allowables for February are slightly higher than for January.

Production may average about 6,500,000 bbl. daily in the first quarter, and the normal seasonal pattern of pro-

duction would indicate about the same level for the last quarter of the year. If the averages for the first and last quarters are as high as 6,500,000 bbl. daily, the forecast demand for the year can be met with production cut back to 6,200,000 bbl. daily for the second and third quarters. Even this allows for an increase in inventories of almost 7,000,000 bbl. during the year.

Stocks are up . . . The Bureau of Mines called attention to the excess supply in a discussion of the general situation affecting demand for crude in February. The report stated, "The total stocks of all oils on November 30, 1952, were 37,400,000 bbl. higher than on November 30, 1951, including a gain of 6,800,000 bbl. in total crude stocks and an increase of 30,600,000 bbl. in total product stocks. These figures indicate that crude supply has been in excess of requirements in the last quarter of 1952 and, currently, in the first quarter of 1953. Consequently, a material decline in the amount of crude oil run to stills seems probable late in the first quarter or early in the second quarter of 1953."

This guarded language is a warning that production and refining are outrunning the market.

Production and refinery runs do not normally drop as much in the summer months as the decline in total demand. The excess is stored to be used to help meet the high demands during the winter months. In the past 7 years, the average buildup each year between the first of April and the end of November has been slightly less than 60,000,000 bbl. A total of 75,000,000 bbl. was added in this period of 1952 despite the loss of production and refinery output during the refinery strike.

Buildup was rapid . . . Many refiners believed that total inventories were too high just before the strike last year, and the rapid buildup following the strike raised the total at the end of November to a level that was 37,000,000 bbl. greater than a year earlier.

At the end of January, stocks of crude and four major products were 42,700,000 bbl. greater than at the end of January 1952. If stocks at the beginning of last summer were too high, the normal conclusion must be that the current supply will have to be cut if stocks are to be down to workable levels by early summer. The current stock excess can be measured by comparison with the total normal summer buildup of about 60,000,000 bbl.

Markets are off . . . Markets are indicators of the balance or lack of balance between supply and demand. Here is how the market has been behaving:

Heavy-fuel-oil prices have been soft in the Mid-Continent and North Central areas for a full year. Group 3 ceiling prices for No. 6 (residual) range from $1.80 to $1.90 per barrel. In the early part of this winter, some high-sulfur material moved as low as $0.70, and even now, low-sulfur residual can be found for $0.90 a barrel. In the first week of February, several Chicago distributors reduced tank-wagon prices by 0.25 cent a gallon, or a little more than 10 cents a barrel.

Tank-car sales of kerosine and No. 2 fuel (home-heating oil) in the Group 3 (Mid-Continent) area within the past 2 weeks have been at prices that were down at least 0.25 cent a gallon from the early winter levels. These cuts were made at a time when demand should be at the season's peak. Group 3 ceiling prices for No. 2 range from about 8.375 cents to 8,625 cents a gallon. The currently quoted low is about 7.5 cents a gallon, and some material may be moving at prices slightly lower. The Group 3 low for kerosine is 8.5 cents compared with ceilings of 9.25 cents to 9.375 cents a gallon.

Tanker rates are down . . . Heating-oil ceilings on the East Coast were raised to correct a lack of balance between East Coast and Gulf Coast prices under tanker rates that existed in 1951 and early 1952.

Under the influence of lower tanker rates this winter, East Coast residual prices were cut about 10 cents a barrel in January. The higher ceilings were set for kerosine and distillate sales on the East Coast, effective June 30, 1952. This increase brought the barge ceilings for New York Harbor to 9.65 cents for No. 2 fuel and 10.65 cents for kerosine.

While these prices have been the generally posted prices for barge delivery in the Harbor, primary and secondary storage had become so crowded by the first of this year, that some of the light fuel was moving at prices at least 0.25 cent under the posting. The towboat strike at the end of January cut down transportation within the Harbor and tended to reduce under-the-low sales.

Lower tanker rates last fall tended to promote shipments out of the Gulf Coast, since there was at least a small chance that rates would go up during the winter. This heavy movement out of the Gulf helped keep prices firm in that area. However, the towboat strike on the East Coast may slow down the movement into New York and cause some increase in primary inventories on the Gulf Coast. Also, large primary and secondary inventories of light fuels in the northeastern states at the end of the heating season will tend to force more kerosine and distillate fuels into the Gulf Coast open market.

Gasoline is plentiful . . . Gasoline prices in the Mid-Continent and north-central states are slightly below normal. Regular-grade gasoline is available at pipe-line terminals at the Group 3 low plus 0.25 cent plus transportation, compared with a normal of low plus 0.5. Material is reported to be readily available at Gulf Coast and East Coast points. Total gasoline stocks at the end of January were 4,000,000 bbl. greater than a year earlier.

California is different . . . Part of the increase in demand on the West Coast has been due to military requirements for operations in Korea and other parts of the Pacific. The removal of price controls may bring some adjustments between light and heavy crude prices to bring them more nearly in line with price differentials that existed before heavy-crude prices were cut sharply during a period of overproduction of heavy fuel.

West Coast supply and demand will be in better balance as soon as Alberta crude is available in the Pacific Northwest through the Trans Mountain pipe line early next fall.

Lubes are suffering . . . Almost all lube-oil prices are now below ceilings. Lube manufacturers are expecting very competitive markets for several years.

Lube-producing capacities have been increased in this country since the end of the war. In the past few years, foreign refiners have been adding lube units. The result has been a sharp drop in lube exports at a time when the capacity to produce lubes in this country is at an all-time high.

Over-all outlook . . . Supply exceeded demand about 115,000 bbl. daily in 1952 and most of this excess is still in storage.

Unless current rates of production and imports are reduced, more crude and products will go to storage. Refinery runs averaged 7,058,000 bbl. daily in January compared with forecast needs for the first quarter of 6,980,000 bbl. daily and for the year of about 6,863,000 bbl. daily. Kerosine and distillate stocks at the end of January were 15,800,000 bbl. greater than a year ago compared with an increase over the previous year of 7,900,000 bbl. at the end of last October.

These will be influencing factors in price changes for the remaining months of this year.

Phillips Enters Alaska

Interior Department approves agreement under which firm will drill 12 tests on million-acre lease block in south

Bertram F. Linz

WASHINGTON.—The first big-scale private development of Alaskan oil was set to get under way last week when Interior Secretary Douglas McKay approved the issuance of a block of more than 500 leases covering nearly 1,000,000 acres in the Katalla-Yakataga area adjacent to the Gulf of Alaska.

The leases were issued following negotiation of a development contract acceptable to the department between Phillips Petroleum Co. and Northern Development Co., the latter a partnership of William T. Foran and Ben G. Gellenbeck who acted for the lease applicants and developed the plan for operation.

Nearly 2 years were required to put the big proposition through, first negotiations being with Deep Rock Oil Corp., which failed to reach an agreement with the department. The department, while eager to have the area developed, has insisted that it be handled as a unit under a satisfactory development plan.

Under the contract, Phillips will drill 12 exploratory wells over a period of 10 years, 6 in each of the 2 districts, and is to expend a minimum of $1,200,000 for exploratory work by June 30, 1956 and annually, thereafter, a sum equal to 40 cents per acre, as a minimum.

The department announcement that the problem had been worked out commented on the difficulty encountered in interesting adequately financed companies in the project. It pointed out that "although the proposal for the development of the area had been discussed in the April 14, 1952, issue of The Oil and Gas Journal and although Northern Development Co. had approached other oil companies, none had indicated an active interest in undertaking an exploratory program that would meet the department's requirements prior to the entrance of Phillips Petroleum Co. into the picture."

(The Interior Department reference to the Journal concerns a detailed geological report on the Katalla-Yakataga oil province prepared by William T. Foran. It begins on page 124 of the April 14, 1952 issue.)

Drilling requirements . . . The Phillips contract provides that only exploration wells will count toward the total the company is to drill. Any production wells drilled after a discovery will not count. Each well to be drilled will be first included in a unit plan whose terms will have to be approved by the department.

The company is to drill two wells prior to June 3, 1956; must commence the drilling of two more in the next 2 years and, beginning July 1, 1959, must drill an exploratory well in each of the two districts in each of the next 4 years.

To the extent that Phillips, between July 1, 1953 and July 1, 1958, expends an amount equal to more than 40 cents per acre, the company will be entitled to apply the excess to the rentals accruing for the next lease year, but since the leases carrry no rental obligation for the second and third years, the department pointed out the major benefit will accrue only in the last 2 years of the period.

What's been done . . . In recent years, except for the Navy's exploration, there has been little activity in Alaska. There was some exploration in the area in the 1920's and at Inskip Bay. One well was actually drilled at a reported cost of $1,000,000, but the leases were allowed to lapse. These leases recently were reinstated, but there are some territorial lands in the area which will require legislation before any operations can be undertaken, a department spokesman said. As in the case of the Phillips operation, the department will insist on development of a unit plan before production is undertaken.

The Katalla-Yakataga area lies along the southeast shore of the Gulf of Alaska, about 50 miles east of the ice-free harbor of Cordova, which, in turn, is 1,550 miles northwest of Seattle.

Full Deliveries Resumed

NEW YORK. — Deliveries of fuel oil to terminals in the metropolitan New York area resumed last week with the settlement of a tugboat workers' strike which tied up harbor movements for 10 days.

The bulk of the light fuel oil, as well as many other commodities, is moved to New York distribution points by water, and the strike had threatened to create an increasingly critical shortage in the area's fuel supply. Some terminal stocks had been exhausted, and dealers resorted to trading arrangements to supply their customers.

The halt in deliveries apparently averted a drop in fuel-oil prices for the time being. It was expected to be a week or more before distribution returns to normal. However, the threat of price reductions still hung over the market because of unseasonal warm weather and oversupply.

Some dealers expected the price of burning oils to remain stable through the remainder of this month with a cut coming later if demand does not improve. The position of heavy fuel oil was even worse. This product was less affected by the strike, and the market was described as "flooded."

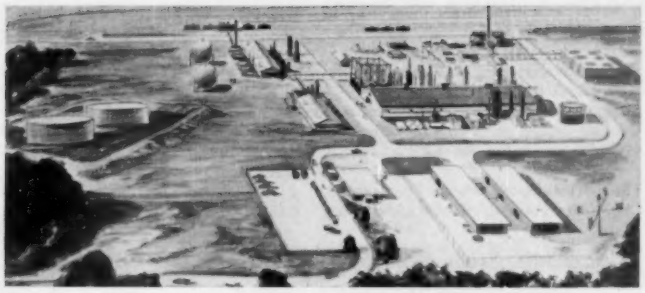
Industry Briefs

VICTORIA, Tex.—Carbide & Carbon Chemicals Co.'s new petrochemical plant under construction at Long Mott, Calhoun County, has been tentatively scheduled for completion by April 1954, according to Dr. Charles Blair, plant manager. The new plant will manufacture ethylene glycol and polythene and plastic compounds in unfinished form, Blair said. Construction is being handled by Brown & Root, Inc., Houston.

TORONTO, Ont.—The chemical engineering division of the Chemical Institute of Canada will join with the American Institute of Chemical Engineers in sponsoring a meeting here April 27-29. A symposium on communications will be one of the outstanding features of the meeting. C. F. Braun, president of C. F. Braun Co., Alhambra, Calif., will be a featured speaker on the symposium.

PHILADELPHIA. — The Material Handling Institute, an organization of equipment manufacturers, will sponsor the National Material Handling Exposition to be held in Convention Hall here, May 18 to 22. A total of 284 companies will exhibit equipment and services. A conference to be held concurrently will feature discussions on general problems of material handling and seminars on handling in process, warehousing and shipping, packaging for improved handling, bulk handling and requirements for organized study and analysis. The conference will be conducted by the American Material Handling Society.

APPROACHES to Spencer's Vicksburg plant.



PROCESS LAYOUT of Spencer's 200-ton per day ammonia plant.

Boom in Ammonia

Spencer Chemical half finished on plant using new direct partial oxidation process; many other plants now building

Kenneth B. Barnes

VICKSBURG, Miss.—Spencer Chemical Co. is nearly 50 per cent complete with its new 200-ton per day ammonia (NH_3) plant here.

This new $12,000,000 petrochemical plant will be the first of its kind to get into operation using direct partial oxidation process. However, several other plants are now starting building. These include Deere & Co., 345-ton plant at Pryor, Okla.; Grace Chemical Co., 200-ton plant at Memphis; and Cooperative Farm Chemicals Corp., Lawrence, Kans.

Spencer at Vicksburg will use 20 million cubic feet of natural gas per day. In the long list of new ammonia plants now being built in the United States (see accompanying list), most will use natural gas; a few "run" on coal.

The natural gas serves, in these ammonia plants, as the source of hydrogen. The other source material is air, which furnishes the nitrogen. Thus with one part nitrogen and three parts hydrogen these plants, with the assistance of catalysts, heat, pressure, and a host of process and purification equipment, turn out ammonia (NH_3)—see accompanying process chart.

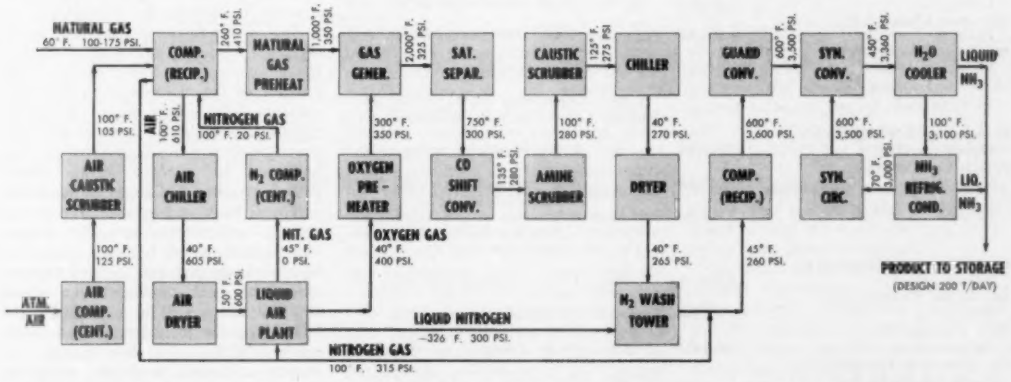
New-plant construction in the ammonia field is booming. Thirty new plants or expansions costing $2 million to $47 million each are included in the Journal's present list of reported activity.

A good many familiar oil company names are in this ammonia plant list—Atlantic Refining, Brea Chemicals (Union Oil), Cities Service, Lion, Phillips, Shell, and Sid Richardson. The current construction list also includes a number of well-known old-line chemical companies, such as Allied Chemical & Dye, American Cyanamid, Commercial Solvents, Mathieson, Pennsylvania Salt, and others. Of the younger strictly "chemical" companies in the ammonia business, Spencer probably is the largest, with its 380-ton plant at Pittsburg, Kans., and 163-ton plant at Henderson, Ky.—besides its new Vicksburg construction.

Ammonia-plant growth . . . The growth of ammonia-plant construction, and the predominance of designs to use natural gas for raw material, was predicted by the Journal's refining editor, George Weber, a year ago *(See The Oil and Gas Journal, March 10, 1952, page 70)*. In Weber's list of projected capacity at that time, grand total tonnage was 6,480 daily, of equivalent nitrogen, with 5,032 tons coming from natural gas.

Ammonia synthesis, particularly that in which natural gas furnishes the hydrogen, got its big boost in the United States during World War II, with the ammonia going into explosives. About a dozen plants were built, but of particular interest to the oil industry were those later leased or purchased by oil companies. These include the Lion plant at El Dorado, Ark.; Phillips at Etter, Tex.; and Spencer at Pittsburg, Kans., and Henderson, Ky.

Shell Oil and Shell Chemical Co.,



AMMONIA FROM NATURAL GAS . . . Process chart for Spencer Chemical's new Vicksburg plant, showing major equipment, temperatures, pressures.

however, were even more pioneering in this field, before the war, with their synthetic ammonia plant and agricultural ammonia research center at Pittsburg (Shell Point), Calif.

(See "The Magic of Petrochemistry" special section in The Oil and Gas Journal, November 30, 1950).

The Vicksburg plant . . . The Spencer Chemical ammonia plant at Vicksburg will purchase its 20 million cubic feet of natural gas daily from a 2-mile takeoff from a main trunk line of United Gas Pipe Line Co. The petrochem plant is located on a 35-acre fenced site on Illinois Central R. R. siding 2 miles southeast of Vicksburg. The company also has purchased 400 acres nearby, lying on the Mississippi River, convenient for water transportation.

Ammonia From Natural Gas—U. S. Plant Construction

Company and location—	Est. cost (dollars)	Capacity (tons/day)	Status
Allied Chemical & Dye Corp.:			
South Point, Ohio	7,500,000	140	To be completed, spring 1953.
Omaha, Neb.	27,500,000	170	Urea plant. To be completed, spring 1953.
Hopewell, Va.	15,000,000	Expansion	Partial oxidation of natural gas.
Ammonia Chemical Corp. of Calif.:			
California area		85	Planned; incorporating.
American Cyanamid Co.:			
New Orleans	47,000,000		Also acetylene, hydrogen, cyanide. To be completed 1954.
Atlantic Refining Co.:			
Philadelphia		100	Ammonia plant. To be completed, summer 1953.
Brea Chemicals, Inc. (Union Oil):			
Wilmington, Calif.	13,000,000	50	To be completed mid 1954.
Cities Service Oil Corp.:			
St. Louis, Mo.	28,000,000		Cert. of necessity.
Commercial Solvents Corp.:			
Sterlington, La.	20,000,000	Expansion	Also methanol. To be completed, spring 1953.
Sterlington, La.			Ammonium nitrate plant.
Cooperative Farm Chemicals Corp.:			
Lawrence, Kans.			
Deere & Co.:			
Pryor, Okla.	20,000,000	345	Urea, ammonia plant.
Delta Chemical Corp.:			
Buras, La.		70	
Filtrol Corp.:			
Vernon, Calif.	5,000,000		Ammonium sulfate, alumina catalysts. Completion fall 1953.
Grace Chemical Co. (W. R. Grace & Co.):			
Memphis, Tenn.	18,000,000	250	Urea, ammonia plant. To be completed, summer 1954.
Gulf States Utilities:			
Beaumont, Tex.			Proposed.
Hooker Electrochemical Corp.:			
Tacoma, Wash.	2,000,000	30	Recently completed.
Howe Sound Co.:			
Forney, Utah		10,000 (annual)	Ammonium sulfate plant.
Lion Oil Co.:			
Luling, La.	31,000,000		To be completed in 1953.
Mathieson Chemical Co.:			
Houston	1,800,000	Expansion	Ammonium phosphate plant.
Mississippi Chemical Corp.:			
Yazoo City, Miss.		100	Plant expansion.
Oklahoma Fertilizer Co.:			
Oklahoma City		20,000 (annual)	Ammonium nitrate, ammonium sulfate, rock phosphate.
Pennsylvania Salt Mfg. Co.:			
Wyandotte, Mich.	2,200,000	55	To be completed, spring 1953.
Phillips Chemical Co.:			
Houston	39,000,000		Also methanol, acetylene. To be completed in 1953.
Houston	5,500,000	Expansion	Ammonium sulfate, triple superphosphate facilities. To be completed late 1953.
Rocky Mountain Chemical Co.:			
Billings, Mont.	8,000,000	120	To be completed mid 1953.
San Jacinto Chemical Co.:			
Houston	900,000	Expansion	Anhydrous ammonia plant.
Shell Chemical Co.:			
Ventura, Calif.	7,600,000	150	To be completed, fall 1953.
Sid Richardson Interests:			
Pointe a la Hache, La.		230	
Spencer Chemical Co.:			
Vicksburg, Miss.	15,000,000	200	To be completed in 1953.

Construction on Spencer's Vicksburg plant started in October 1951. Partial operation is scheduled to start in October 1953, with full operation by January 1954. In preparing the plant site, and bases for two large steel tanks for anhydrous ammonia storage, some 800,000 yards of earth have been moved and recompacted. Pipe lines of various sizes have been strung throughout the plant—over 25,000 ft.—in sizes from 42-in. on down. The pipe line services vary from plant facility duties up to handling hot synthesis gas at 2,000° F., and gas conversion material at pressures of 3,600 psig.

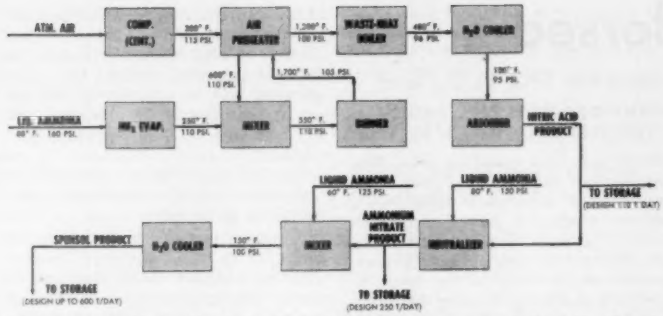
Two contractors are building the Vicksburg plant. Quaker Valley Constructors, Inc., a Spencer subsidiary, is building the main plant site, compressor and process facilities, office and laboratory building, warehouses, etc. Foster Wheeler Corp. is building the partial oxidation-gas purification units. The two contractors together are using about 300 construction workers. Fred Hodge is president and general superintendent for Quaker Valley, and Bob Hudson construction superintendent for Foster Wheeler.

Spencer plans to operate the new plant with only 120 people, including office personnel. These will include a works manager and production superintendent—Frank Pyle and Byron Kern—who are at Vicksburg now going through the complete construction period—plus an assistant production superintendent for each of the four operating shifts and a chief operator for each shift.

Process description . . . In the processing, natural gas is compressed to 410 psig. after preheat. It goes to generators for partial oxidation. Air is compressed to 610 psig., liquefied, and distilled into its oxygen and nitrogen components. The oxygen then is vaporized and sent to the gas generators, where it partially oxidizes the natural gas.

Part of the nitrogen from the liquid-air plant, as liquid nitrogen, is used in the ammonia purification process. The balance of the nitrogen from the compressors is added to the synthesis gas stream in the correct amount so as to maintain an approximate three to one, hydrogen to nitrogen ratio, which ratio is required for ammonia synthesis.

To go back and pick up the gas at the gas generators—here the oxygen and natural gas are partially burned to liberate hydrogen and carbon monoxide. Steam and condensate are added and the gas is sent to a catalyst-filled CO-shift converter, where carbon monoxide is shifted to carbon dioxide, liberating additional hydrogen from the steam. The gas then is passed to a monoethanolamine scrubber which se-



NITRIC PRODUCTS... Nitric acid, ammonium nitrate, and "Spensol" plants (Spencer Chemical, Vicksburg).

lectively absorbs the carbon dioxide. The stream thence runs to a caustic scrubber which removes the final traces of carbon dioxide.

After more purification, there is obtained an essentially pure mixture of hydrogen and nitrogen gas which is compressed to 3,600 psig. The gases pass to a guard converter where traces of natural gas, carbon monoxide, oxygen, etc., are removed. In the synthesis converter the hydrogen and nitrogen join chemically in the presence of a catalyst to form ammonia gas. When condensed, this is liquid NH_3.

Other nitric products . . . Spencer also is building at Vicksburg nitric acid, ammonium nitrate, and "Spensol" plants wherein its liquid ammonia can be further processed. In the manufacture of nitric acid, air is compressed through a centrifugal compressor to 115 psig., after which it is preheated and mixed with ammonia vapors which, in turn, are passed across a platinum catalyst in a burner. Here the ammonia is oxidized to various nitrogen oxides. These oxides are then absorbed in condensate to form a 50 to 60 per cent nitric acid product.

The acid product in the manufacture of ammonium nitrate is neutralized with anhydrous ammonia, forming a water solution of ammonium nitrate. This solution is further ammoniated by the addition of anhydrous ammonia. This is marketed under Spencer's trade name of Spensol, a high-nitrogen-content series of ammoniating solutions.

The farmer benefits . . . These modern ammonia plants are welcome additions to natural gas territory, and to the natural gas economy. For one thing, the plants "upgrade" natural gas to a high degree, product-value-wise. The value of ammonia, as made from natural gas which sells at well heads at prices ranging from 5 to 20 cents per M.c.f., can be found time after time in practical examples arising from its main market outlet—agriculture.

The quantities of natural gas required for the basic raw materials for a ton of anhydrous ammonia would sell as fuels for approximately $10. However, by putting natural gas through an ammonia plant the natural gas is "upgraded" into much more valuable commodities. A finished ton of ammonia thus obtained by the upgrading sells for approximately seven times the cost of the original quantity of natural gas.

But next to the farm. This original $10 worth of natural gas, processed from 1 ton of anhydrous ammonia into 2 tons of nitrate fertilizer, is sold, say, to a Kansas farmer for about $140, delivered. As a result of the application of these two tons of material to 40 acres of his corn, the farmer receives an additional yield of about 720 bu. This, at today's prices, returns to the farmer about $1,000 of additional income.

In one outstanding Central Missouri test, the yield of corn was 51.4 bu. an acre where no fertilizer was used. When 125 lb. of ammonium nitrate was applied as the only fertilizer, yield was 93.4 bu., an increase of 42 bu. made by 1¼ sacks of ammonium nitrate. In this case, nitrogen probably was the principal plant food lacking.

New plants near agriculture . . . The big bulk of the production from these new ammonia plants in the future will go, as it does now, into agriculture. It pays the farmer to buy. The country's, and the world's, population is growing. More foodstuffs are needed. And so, more agriculture, more intensive farming, more fertilizer material, more natural gas used.

A glance at the Journal's construction list will show that these new plants are strategically located near large agricultural areas, or outlets thereto—plus access to a good source of natural gas. In this connection it is a correct statement, and proven by repeated inquiries that have come to The Oil and Gas Journal, that the market-research engineers of the oil-chemical companies who are scanning opportunities for new ammonia plants are looking for two simple combinations—lots of farms and a tap on a natural-gas pipe line!

In addition to this description of the direct partial oxidation process, The Oil and Gas Journal in other detailed articles has covered design and operation of representative ammonia plants of several other oil and chemical companies. These include Lion's plant at El Dorado, Ark. (June 22, 1946, page 98); Spencer Chemical at Pittsburg, Kans. (August 4, 1949, page 40); and Phillips at Etter, Tex., and Houston (January 12, 1953, page 85).

New Weed Killer

Cotton-field weed remover is Spencer's latest product

PITTSBURG, Kans. — Latest petrochem product in Spencer Chemical Co.'s agricultural chemical line is "HO-NO-MO." This is isopropyl N-(3-chlorophenyl) carbamate.

The new product is aptly named. Until recently it was necessary to hoe grass out of rows of cotton by hand. The new chemical, however, will kill grass in the treated area without damaging broad-leaf plants such as cotton, beans, etc.

Spencer first got into the processing and preparation of this product in its research department in 1949. Engineering and design of the pilot plant to make the new agricultural chemical was begun in the fall of 1951. Pilot-plant-scale production is now under way.

Spencer's pilot plant for the production of this weed killer entailed installation of distillation columns, tanks, filters, scales, instruments, process piping, and a high-pressure reactor weighing 36,000 lb.

In tests for the removal of grass out of the rows of cotton, by the application of only 2 lb. of "HO-NO-MO" per acre, the cost of grass control is reported to be decreased (chemical control) to $10 per acre as compared to as much as $30 per acre for hoe labor.

Product application . . . Spencer's research and market engineers here decided to ship the liquid mixture to the farmers in cans and drums.

Spencer's new "HO-NO-MO" is not without competition. At least three other chemical companies are producing the material for sale. It will not be in direct competition with 2-4-D and other established weed killers, for it is selective to grasses and will not affect broad-leaf plants.

Oil Policy Endorsed

A.P.I. outlines its attitude toward the FPC, I.L.O., and the UN nationalization resolution; endorses NPC policy

NEW YORK.—The executive committee of the American Petroleum Institute last week formally endorsed the National Petroleum Council's "national oil policy of the United States."

In announcing the action, Frank M. Porter, A.P.I. president, said the move places the Institute squarely behind these principles:

... **That participation** by U. S. oil men in the development of the world's oil resources is in the interest of all nations, and is essential to this country's security,

... **That U. S. oil men** should be encouraged to develop global oil resources on equal terms with other nations, and to work out stable agreements with foreign governments on a basis which will promote development by free enterprise methods,

... **That the U. S. Government** should use its diplomatic prestige and channels to reduce the political risks involved in such foreign operations, and permit U. S. oil men to operate abroad in conformity with the laws and customs of other countries,

... **That the nation's** economic welfare and security require a policy on petroleum imports which will encourage exploration and development efforts in the United States, and which will make available a maximum supply of domestic oil to meet the needs of the nation.

Porter said this means that the Institute concurs with the philosophy that imports of foreign oil should be used to supplement but not displace or retard domestic production. He said the executive committee's action provides the Institute with positive policies in areas where none existed before.

The NPC formulated its "national oil policy" in 1949 at the request of the Secretary of the Interior. It embodies a series of principles designed to promote the welfare and security of the United States through the maintenance of a healthy petroleum industry.

The endorsements of the NPC conclusions were recommended to the executive committee by the Institute's national oil policy committee, which is headed by Alfred Jacobsen, president of Amerada Petroleum Corp.

Other acts . . . Other important steps taken by the executive committee at the same meeting were these:

... **A recommendation** that congress clarify the authority of the Federal Power Commission in regard to natural gas. This resolution said: "The decisions of the Federal Power Commission and the courts which would subject production and gathering of natural gas and the price received by the producer to control by the commission are contrary to the intent of Congress and are preventing the movement to consumers of vast quantities of natural gas under competitive conditions.

"A sound national policy was intended to be established by Congress in this regard in the natural gas act of 1938 by exempting production and gathering of natural gas from such control. It is in the public interest, both of producers and consumers, that such control or threat of control by the commission be removed by Congress."

... **A formal call** on the United Nations general assembly to reconsider a resolution endorsing the principle of nationalization without providing for indemnification for expropriated properties. The A.P.I. executive board declared: "The whole tenor of the resolution supports, condones, and encourages nationalization of industry, particularly natural resources, contrary to the best principles evolved in a free economy and in violation of the essential principles of just, prompt, and adequate compensation previously provided for."

The UN resolution was adopted last December 21 despite the protests of the American delegation.

... **Agreement that the A.P.I.** should call upon the United States Government to withdraw from the International labor organization, of which it has been a member since 1934. The executive committee held that the I.L.O. and its staff are dominated by an atmosphere hostile to the American form of government and way of life, and that its membership numbers few nations which uphold free enterprise as a worthy objective.

This proposal was referred to the president's advisory committee on international affairs for recommendation to the April meeting of the full board of directors.

... **Appointment of a study committee** to work with the American Petroleum Industries Committee and others on the question of highways, and to bring forward a report with recommendations for a policy on this critical matter at the April board meeting.

New Processing Slant

Lube-oil yield, throughput affected by boiling range of distillate fraction, other factors, King tells W.P.R.A.

F. Lawrence Resen

BEAUMONT, Tex. — The boiling range and degree of stripping of distillate fractions and the front-end distillation of residuum have a substantial influence upon yields, throughputs, and operating conditions in processing lubricating oils.

It is not generally recognized by refiners that the above factors affect lube-oil production, according to D. E. P. King, Pure Oil Co., Nederland, Tex., although it is readily apparent that boiling range, flash, and viscosity of finished lubricating stocks largely are determined in the vacuum-distillation step.

Speaking at the regional meeting of the Western Petroleum Refiners Association here February 12-13, King said actual operating experience plus experimental results and theoretical considerations have shown conclusively that deasphalting, extraction, and dewaxing operations are influenced substantially by the front-end distillation and degree of stripping of the residuum fraction produced in the vacuum-distillation operation. This influence upon the dewaxing operation is especially troublesome in some instances.

Similarly, he said, the degree of stripping and particularly the boiling range of lube distillates affect extraction and dewaxing operations strongly. The effect of boiling range of these stocks in dewaxing results has been especially outstanding. In certain instances it has been found expedient to adjust the viscosity of finished neutrals so that distillates of optimum boiling range could be produced for the dewaxing and recrystallization operations.

Propane deasphalting . . . There is considerable difference of opinion, King said, regarding the degree of influence upon deasphalting results caused by the presence of ethane, butane, or propylene in the propane solvent.

After consideration of differences which exist between stocks and varia-

bles in different plants, it is concluded that the effect of these contaminants largely is determined by the nature of charge and product desired and other conditions existing in the various units under consideration, he said.

A simple change in spacing in bottom of a deasphalting tower had an interesting effect upon asphalt solution leaving the bottom of the tower, he said. By merely substituting 6 baffle trays spaced 18 in. apart for 9 trays 12 in. apart, the propane ratio of 1.7 to 1 in the asphalt solution leaving the tower was reduced to a ratio of less than 1 to 1.

Phenol extraction . . . King reported on 3 years of operation of a phenol-extraction unit in which temperature gradients ranging from 0° F. to as much as 30° F. were employed. Tentative conclusions reached were:

. . . Stabilizing influence is exerted on treating-tower operation by use of zero or low-temperature gradient.

. . . Maximum yield of raffinate of given viscosity index is obtained by use of limited temperature gradient combined with optimum amount of water in the bottom of the treating tower.

. . . The major portion of temperature gradient should be between oil feed point and top of treating tower.

Stability of operation and yield of raffinate of improved viscosity is influenced favorably by the following factors, he said:

1. Use of relatively high solvent ratio and relatively low treating temperature.
2. Adjustment of oil-feed temperature and temperature and amount of phenolic water injections to produce minimum temperature and viscosity of extract solution consistent with satisfactory separation of a clear bottom effluent stream.
3. Adjustment of temperature of phenol feed to produce a top temperature on treating tower which is just below the point at which flooding or instability of tower operation becomes evident.
4. Use of water injection in phenol feed to the treating tower when high yield and low degree of viscosity improvement are desired.

MEK-toluene dewaxing . . . Use of optimum MEK content in the dewaxing solvent hinges to a considerable extent on creation of an optimum set of operating conditions in the dewaxing process, King said. To establish the optimum conditions in a given plant, the dewaxing operation involves coordination of numerous complex factors.

A certain amount of adjustment of conditions can be done most efficiently by trial and error, he said, but a certain degree of theoretical evaluation can be used as a guide in regulation of such factors as dilution rates and drum speed, as well as in the determination of optimum solvent composition.

Statistics in Refining

They can provide quality control, W.P.R.A. is told

BEAUMONT.—The refiner should consider statistical quality control as a tool, L. J. McGovern, of Magnolia Petroleum Co., Beaumont, told the Western Petroleum Refiners Association's regional meeting here.

It is a mathematical means of measuring random-chance variation or of estimating average error, he said.

For every operation in the refinery there is a certain amount of random-chance variation which will vary from plant to plant, unit to unit, and batch to batch. The refiner's problem is to determine in which of his processes chance variation is significant.

Studies have shown that only the repetitive type processes fall into this category. Major variations in continuous processing units are the results of assignable causes, he said.

In applying this statistical tool to the processing units it is necessary to first evaluate the assignable causes of variation and then apply statistics to measure the remaining unassignable chance causes of variation, he said. Development of such an approach is still on the drawing board, he said.

Empirical equations have their limitations, McGovern continued. They are only as representative as the data from which they were developed and only as accurate as choice of the original equation to which the data was fitted. At present such relationships are in the hands of the engineers who are developing them.

Refiners' Meet Set

A.P.I. group will study new processes, corrosion

NEW YORK. — A varied program concerning new refining processes, deterioration of metals, corrosion, gasoline volatility, and detonation characteristics is scheduled for the eighteenth midyear meeting of the American Petroleum Institute Division of Refining, to be held here May 11-14.

Two sessions on analytical research will include papers outlining improved tests for contaminants in waste water and several analytical studies involving spectrochemical and semimicro methods for examining petroleum stocks.

Progress reports will be presented on the study of graphitization of steel, co-sponsored by the A.P.I. nearly 2 years ago following the failure of certain catalytic cracking reactors attributed in part to this type of metal deterioration. Corrosion will be the subject of another special session, including papers dealing with the use of organic inhibitors, estimation of corrosivity of crude oils, atmospheric corrosion, and deterioration of redwood cooling towers.

New refining processes . . . New processes will be reported in four papers on Anglo-Iranian Oil Co.'s Autofining, the Shell Oil Co. Hydrodesulfurization process, Socony-Vacuum Oil Co., Inc.'s Thermofor Continuous Percolation process, and Houdriforming. A session on gasoline volatility will include reports on passenger-car-performance studies and a review of vapor-lock data.

Another session on motor fuels will concern the comparison of L.P.G., gasoline, and diesel fuel in city buses, preignition in automotive engines, and the recycling of exhaust gases for suppression of knock in internal-combustion engines. Electrical equipment, training, and lubricating oils will also be covered in separate sessions.

The eleven technical sessions and the open dinner session will be held at the Commodore Hotel. Reservations are to be made direct to the hotel.

ROCKY MOUNTAIN

Northern Pacific Land Leased

BILLINGS, Mont. — Northern Pacific Railway last week announced it has concluded two leases with Stanolind Oil & Gas Co. in the Montana portion of the Williston basin which provide for a 30 per cent royalty.

LeRoy H. Hines, Northern Pacific vice president in charge of oil development, said Amerada Petroleum Corp. will hold an undivided half interest in the leases.

The first lease involves 8,860 acres in the Southwest Weldon area. The second covers 7,150 acres in the Lindsey area. Both agreements require the drilling of a wildcat to a maximum depth of 11,500 ft., with drilling operations to begin within 90 days.

Another lease has been concluded with Cities Service Oil Co., Hines said. This one involves 3,900 acres in the Hedgesville area of Montana's Wheatland County, outside the Williston basin. Continental Oil Co. will hold an undivided half interest. Hines said that this lease agreement was on "substantially Northern Pacific's lease form." The agreement requires drilling of a well to a maximum depth of 7,000 ft. by May 14.

Line Pipe Allocated

289,026 tons made available for oil industry during second quarter; needs of 12 big crude, 11 products lines to be met

WASHINGTON.—A total of 289,026 tons of line pipe will be made available for use by the oil industry during the second quarter.

Needs of 12 large crude lines and 11 products lines, together with those for an unspecified number of smaller projects, will be met by allocations announced by the Petroleum Administration for Defense.

The 23 large projects, which will require a total of 1,025,014 tons of pipe and cost $490,470,700, will receive 251,306 tons for use during the quarter, or approximately one-fourth of their total needs. The smaller projects will be given 37,720 tons for such facilities as terminals, small construction and maintenance, repair, and operation.

Six projects, five of them for products, will receive priorities assistance for the first time, as follows:

... **Platte Pipe Line Co.:** 93 miles of 12 and 14-in. crude feeder line from Big Horn basin to Platte's Chatham station, estimated cost $3,027,000, for completion in the fourth quarter 1953; given its total requirement of 8,987 tons.

... **H. W. Bass & Sons, Inc.:** 152 miles of 4 and 6-in. products line from Duval and Live Oak counties, Texas, to Corpus Christi, estimated cost $2,822,000, with an initial capacity of 9,000 bbl. daily, for completion in fourth quarter; given its total requirement of 6,625 tons.

... **Wolverine Pipe Line Co.:** 300 miles of 16-in. products line from East Chicago, Ind., to Detroit and Toledo, estimated cost $15,450,000, with an initial capacity of 95,000 bbl. daily, for completion in first quarter 1954; given 9,000 tons against total requirement of 44,900 tons.

... **Phillips Pipe Line Co.:** 70 miles of 12-in. loops along a products line between Borger, Tex., and Paola, Kans., to increase capacity by 15,000 bbl. daily, estimated cost $2,834,000, for completion in fourth quarter 1953; given its total requirement of 8,168 tons.

... **Continental Pipe Line Co.:** 593 miles of 8-in. products line from Billings, Mont., to Spokane, Wash., cost $14,150,000, with an initial capacity of 14,000 bbl. daily, for completion in fourth quarter; given 10,000 tons against a total requirement of 39,023 tons.

... **Inland Empire Pipe Line Co.:** 504 miles of 10-in. products line from Billings, Mont., to Spokane, Wash., estimated cost $17,962,000, with an initial capacity of 9,000 bbl. daily, for completion in fourth quarter; given 10,000 tons against a total requirement of 38,800 tons.

Allocations also were made for two projects which were granted pipe for the current quarter after PAD's announcement of allotments, as follows:

... **Sun Pipe Line Co.:** 49 miles of 8-in. crude line from Toledo to Inkster Junction, Mich., to connect with existing 8-in. line for supplying the new Sarnia, Ont., Canada, refinery, estimated cost $1,315,000, with an initial capacity of 10,000 bbl. daily, for completion in third quarter 1953; given 128 tons for first quarter and 3,377 tons for second quarter to fill requirement of 3,505 tons.

... **Salt Lake Pipe Line Co.:** 140 miles of 8-in. products line from Pasco to Spokane, Wash., estimated cost $3,930,000, initial capacity 13,750 bbl. daily, for completion in third quarter; given 362 tons for first quarter and 3,248 tons for second quarter against total requirement of 8,463 tons.

Other allocations for the second quarter were as follows:

... **West Coast Pipe Line Co.:** 960 miles of 24 and 26-in. crude line from Wink, Tex., to Norwalk, Calif., estimated cost $101,128,000, initial capacity 200,000 bbl. daily, for completion first quarter 1954; given 30,000 tons against total requirement of 213,658 tons.

... **Phillips Pipe Line Co.:** 45 miles of 12-in. crude line from Missouri City to Sweeny, Tex., estimated cost $1,851,000, initial capacity 35,000 bbl. daily, for completion in third quarter 1953; given 268 tons against total requirement of 4,152 tons.

... **Service Pipe Line Co.:** 41 miles of 4, 6, and 8-in. crude line in Williams and Mountrail counties, North Dakota, estimated cost $380,000, for completion second quarter 1953; given 511 tons to complete 1,559-ton requirement.

... **Lakehead Pipe Line Co.:** 635 miles of 30-in. crude line from Superior, Wis., to international boundary near Sarnia, Ont., Canada, estimated cost $76,147,000, initial capacity 100,000 bbl. daily, for completion in fourth quarter, given 72,365 tons against total requirement of 155,619 tons.

... **Shell Pipe Line Co.—"Rancho":** 557 miles of 16, 24, and 26-in. crude line from McCamey, Tex., to Houston, estimated cost $41,649,000, initial capacity 209,000 bbl. daily, for completion in second quarter; given 202 tons to complete requirement of 118,716 tons.

... **Continental Pipe Line Co.:** 217 miles of 12-in. crude line from Wichita Falls, Tex., to Ponca City, Okla., estimated cost $4,200,000, initial capacity 40,000 bbl. daily, for completion in third quarter; given 5,390 tons against a total requirement of 18,725 tons.

... **Interstate Oil Pipe Line Co.:** 101 miles of 4 to 16-in. crude line to expand South Louisiana system and increase capacity by 22,000 bbl. daily, estimated cost $4,871,000, for completion in second quarter; given 842 tons to complete requirement of 9,591 tons.

... **Humble Pipe Line Co.:** 71 miles of 16 and 18-in. crude line from Hawkins field, Texas, to Louisiana State line near Shreveport, estimated cost $2,758,000, initial capacity 77,000 bbl. daily, for completion in third quarter; given 5,760 tons against total requirement of 9,500 tons.

... **Sun Pipe Line Co.;** 27 miles of 4, 6, and 8-in. crude line to connect new production in Southwest Fisher County, Texas, estimated cost $445,000, for completion in third quarter, given 870 tons against total requirement of 1,627 tons.

... **Interstate Oil Pipe Line Co.:** 166 miles of 18 and 22-in. crude line to revise system between Louisiana-Texas border near Shreveport, and Baton Rouge, La., estimated cost $10,020,000, capacity increase 26,000 bbl. daily, for completion in fourth quarter; given 10,132 tons against total of 33,828 tons.

... **Buckeye Pipe Line Co.:** 364 miles of 8 to 16-in. products line from Linden, N. J., to New York state points, estimated cost $24,000,000, initial capacity 80,000 bbl. daily, for completion in first quarter 1954; given 15,905 tons against total of 46,163 tons.

... **United States Pipe Line Co.:** 1,595 miles of 22 and 24-in. products line from Port Neches, Tex., to Newark, N. J., and 204 miles of feeder lines, estimated cost $141,091,000, initial capacity 300,000 bbl. daily, for completion in first quarter 1954; given 35,000 tons against total of 319,500 tons.

... **Phillips Pipe Line Co.:** 66 miles

of 10-in. products line from Brookshire to Sweeny, Tex., estimated cost $1,985,000, initial capacity 25,000 bbl. daily, for completion in third quarter 1953; given 510 tons against total of 5,613 tons.

... **Standard Oil Co. (Ind.):** 243 miles of 10 and 12-in. products line from Whiting, Ind., to River Rouge, Mich., estimated cost $11,544,700, initial capacity 49,000 bbl. daily, for completion in fourth quarter; given 11,760 tons against total of 25,334 tons.

... **Sinclair Pipe Line Co. (Harbor products):** 90 miles of 16-in. products line and 38 miles of feeder and delivery lines from Philadelphia area to New York harbor area, estimated cost $8,911,000, initial capacity 110,000 bbl. daily, for completion in third quarter; given 2,386 tons against total of 14,894 tons.

Tidelands Action

Senate and House committees begin hearings on upwards of 30 proposed bills; both hope to dispose of issue soon

WASHINGTON.—Hearings on tidelands legislation opened on both sides of the Capitol this week as opposing forces lined up for what congressional leaders hope will be the last fight over the issue.

The Senate Interior Committee got under way February 16, and the House Judiciary Committee started the following day. Leading off with Atty. Gen. Herbert E. Brownell, many of the witnesses will shuttle from one hearing to the other, probably over a period of some days.

The Senate hearings are being conducted by a subcommittee headed by Sen. Guy Cordon of Oregon. A House subcommittee is headed by Rep. Louis E. Graham of Pennsylvania.

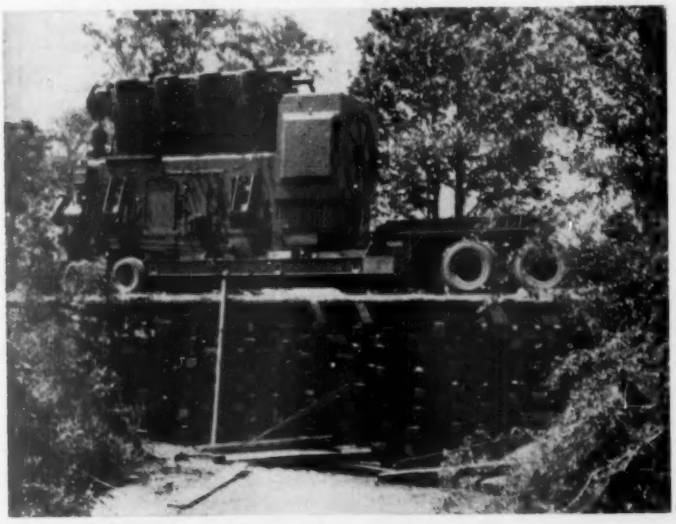
Maze of bills . . . The House committee has before it 27 bills dealing with the tidelands, the great majority of them providing for return of title to the states. There are fewer bills pending in the Senate, but the Senate committee also has the "last ditch" measure, sponsored by Sen. Estes Kefauver of Tennessee and seven other members, to delay final disposition of the tidelands by providing for establishment of a commission to study the whole submerged-lands problem. Such a study could take years to complete and keep the issue alive indefinitely.

None of the bills that have been introduced has been labeled an administration measure, but the Republican platform, President Eisenhower, and Republican congressional leaders have stated their approval of return of the tidelands to the states. It is expected that quitclaim legislation will quickly get subcommittee approval and be favorably reported by the full committees.

Early action expected . . . Although the tidelands question was not given precedence in the list of "must" measures to be passed by Congress, leaders in both Senate and House said they were anxious to get it out of the way as early in the session as possible so as to remove what might be a stumbling block to the proposed adjournment of Congress next July. With the threat of a presidential veto removed, they believe this can be accomplished in a matter of weeks.

Both subcommittees hope to clean up their hearings in days rather than weeks. They are asking witnesses to be brief, to file any statements they wish to present, and confine their verbal testimony to a resume and short argument on the points they raise.

Witnesses will be heard on all types of legislation that have been introduced on the subject. These include: (1) measures for quitclaim, (2) bills to continue the controls exercised by the Interior Department until former President Truman ordered the offshore oil fields covered into a naval petroleum reserve, (3) bills to use federal revenues from offshore operations for aid to education or reduction of the national debt, (4) and measures providing for administration of the area beyond state boundaries with the states to get a share of the revenue, as well as the Kefauver resolution.



Bridge Given a "Helping Hand"

This country bridge had to have a little "moral" support to stand the load of heavy gas engines for a new compressor station located in Mississippi. The contractor, Tellepson Construction Co., Houston, added these heavy timbers so that the bridge could support the load. The compressor station is being built for a natural-gas pipe line.

"Must" Legislation Cited

WASHINGTON. — An 11-point "must" program for the 1953 session was set up last week by Congressional leaders.

Tidelands legislation was sixth on the list, but the measures will not necessarily be taken up in the order in which they were listed.

One item on the list has already been disposed of. Both chambers have approved legislation extending the President's authority to make reorganizations of government agencies.

In order of their listing, the bills earmarked as "must" by the administration deal with reorganization, appropriations, statehood for Hawaii, amendment of the Taft-Hartley Act, limited extension of materials controls

and allocations, tidelands, reciprocal trade, customs simplification, social security amendments, aids to education, and District of Columbia government.

Several of the subjects already are under consideration. Hearings have been started on the Taft-Hartley Act and are about to open on tidelands and extension of the Defense Production Act.

Oil Revenue Sought

Rights on public lands are states, Hunt claims

WASHINGTON.—Legislation granting to the several states the mineral rights underlying their public lands has been introduced in Congress by Sen. Lester C. Hunt of Wyoming.

Urging the Senate to support his measure, Hunt declared the same principles to the public lands as in the case of the tidelands and the federal Government should hold no rights to the underlying resources in either area.

For 14 years a member of the Wyoming State Land Board, Hunt declared:

"I have first-hand knowledge of the efficiency of the state government as compared with the federal Government in the administration of such lands, and I am thoroughly convinced that the mineral rights underlying federally owned lands can be administered more directly and more profitably by local government than by the Department of the Interior."

What bill would do . . . The bill would remove from the federal Government and give to the states all mineral rights underlying federally owned lands except national forests, parks, and monuments, wildlife preserves, lands that have been entered upon, land containing fissionable materials, or land that is being used by the Government for special services.

The states would assume existing leases and contracts, and administer the rights that would be transferred to them.

"I have never been able to understand the theory or reasoning behind the retention by the federal Government of the ownership of mineral rights in the western states when that theory is not and never has been applied to states not designated as public-land states," Hunt declared.

"Entitled to revenues" . . . "We of the western states are as rightfully entitled to the revenues produced from minerals under public lands in our states as are the states in coastal areas involved in the so-called tidelands issue."

WATCHING WASHINGTON

Bertram F. Linz

Tubular-Goods Needs

The Petroleum Administration for Defense is studying the probable level of drilling activity over the next 3 years with a view to matching the tubular-goods needs of the industry against figures compiled by the National Production Authority on the output of oil-country goods by the steel industry.

PAD'S consultants met with officials last week to project drilling operations through 1955. Their figures will be checked against PAD estimates to get a good picture of tubular-goods requirements and for the calculation of reserves to tell the military how much capacity there should be on given dates.

After a long series of discussions, NPA has furnished more detailed information on present and future tubular-goods capacity in the steel industry and PAD, in turn, is developing this picture of industry requirements to match against the steel facilities.

When the survey is completed, PAD officials will be able to speak with certainty regarding any further expansion of steel capacity that may be necessary to carry out the oil industry's drilling program, and will be able to give the steel manufacturers some assurance regarding the permanence of the demand for tubular goods which many, in both NPA and the steel industry, have heretofore viewed as merely temporary.

Groundwork for Crisis

Lifting of wage controls by President Eisenhower is seen as laying the groundwork for a grave industrial crisis by midsummer.

Experienced labor observers in Washington look for Walter Reuther to move quickly to demand a reopening of his 5-year contract with General Motors, one of the aims of which will be the elimination of the present escalator clause by which wages move up or down in conformity with the cost-of-living index.

Reuther has never been too satisfied with that contract, believing he could have secured more for his union members if the Government had not exerted influence upon him. Recent developments have been a further slap at his leadership of labor and he is said to believe that in giving top posts in the Labor Department to A. F of L. men the administration is playing footsies with that organization.

In other words, it is believed Reuther may want to teach the new administration a lesson before it gets too far ahead of him, even though his personal ambition may precipitate widespread trouble in industry.

Since General Motors is the bellwether of the entire automobile industry and the wage agreements made with the motor manufacturers tend to spread to other industries, observers believe that labor disputes will be widespread by June 30.

Channeling Research

The National Science Foundation believes that industrial research should be carried on by industry and the Government, with the universities devoting themselves to basic science.

Within the past decade, spurred originally by the demands of war, the universities have gone deeply into research and development for practical ends, often to the extent where such work collides with basic research and teaching. Since the result may be a decline in the flow of new scientific knowledge and of highly trained scientists, it raises a problem for the NSF.

Much of the extension of research into industrial fields by the universities has been due to their need for funds and it has been recommended by Dr. Alan T. Waterman, director of the foundation that government grants to them be materially increased in order that universities and colleges might carry on their teaching and research without the necessity of going in business.

While the oil industry itself has gone in for research in a big way, many other industries have been unwilling or unable to expend the large funds necessary to establish their own laboratories. They, as well as the Government itself, have gone to the universities for help and the universities have had to employ scientists and technicians and are in effect, competing with industry.

Dr. Waterman believes that research that could be done in the Government's own laboratories or by industry should be channeled in those directions.

How

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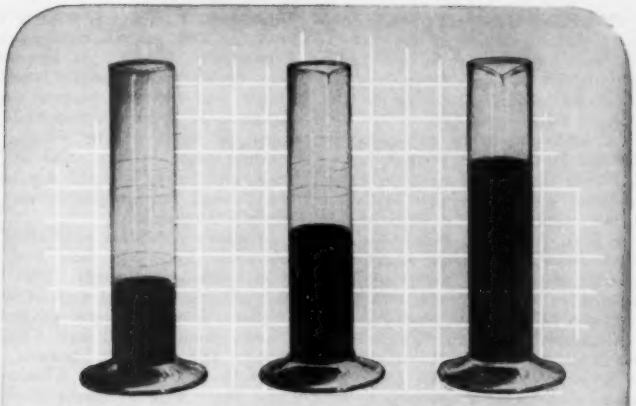

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Antitrust-Law Scanning Set

WASHINGTON.—The Senate Judiciary Committee began preparations last week for what may be an extensive investigation of the antitrust laws and their administration, including the handling of the oil-cartel case.

A subcommittee to be headed by Committee Chairman William Langer of North Dakota was set up to handle antitrust and monopoly legislation. Other members of the subcommittee are Sens. Robert C. Hendrickson of New Jersey and Everett Dirksen of Illinois, Republicans; and Harley M. Kilgore of West Virginia, and Estes Kefauver of Tennessee, Democrats.

Details of the committee's plans for the investigation were not disclosed but it is expected to ask the House for authority to make a sweeping investigation of monopoly and its control.

Products Exports Decline

WASHINGTON.—Exports of major oil products dropped sharply during the week ended January 16 to an average of 127,300 bbl. daily from 181,700 bbl. daily in the preceding week, according to figures compiled by the Petroleum Administration for Defense.

Shipments were at the lowest level since the week ended February 22, 1952. All five major products showed sharp declines from the week ended January 9.

Details of the week's movements, compared with the preceding week, and averages for the 4 weeks ended January 16 are shown in the accompanying table, in thousands of barrels daily.

	Week ended		Average
	Jan. 16	Jan 9	4 weeks
Aviation gasoline	35.5	37.0	36.8
Motor gasoline	17.3	28.7	44.1
Kerosine		13.7	10.9
Distillate	42.0	57.3	51.1
Residual	32.5	45.0	35.3
Total	127.3	181.7	178.2

WEST COAST

Wilshire Sale Pends

Monterey buys Texas wells, may get company control

LOS ANGELES.—Monterey Oil Co. has purchased a two-thirds interest in the California and Texas oil-producing properties of Wilshire Oil Co., Inc. The properties currently are producing about 13,000 bbl. daily.

Wilshire's 22,000-bbl. refinery at Norwalk, its marketing business, and its unproved acreage were not included in the transaction.

However, R. F. Forch, Wilshire vice president and general manager, said February 10 Wilshire has adopted a plan of liquidation, and it was expected that Monterey shortly would announce purchase of a two-thirds interest in Wilshire. The George L. Machris estate owns a third of the stock, and it was expected that Monterey would act as operator for the Machris interest.

Wilshire's California production totals about 3,000 bbl. daily from 69 wells, with approximately 1,700 bbl. daily coming from nine wells in South Cuyama field. Its Texas production consists primarily of 18 wells in Snyder County, with a 100-bbl. allowable, and 15 wells in the Wilshire Ellenburger field which have a current allowable of 550 bbl. daily. In this field it owns a gasoline plant jointly with Lone Star Gas Co.

Forch said that pending final dissolution, Wilshire's refinery, as well as its marketing business, will be conducted in the customary manner and without change in personnel.

CANADA

Export Essential

Alberta premier says need for gas outlets is serious

EDMONTON, Alta.—A strong hint that Alberta is interested in exporting its natural gas has been thrown out here by Premier E. C. Manning.

The premier stated that the need for additional outlets for Alberta natural gas "is getting serious."

He added, "A tremendous amount of cash is tied up in capped wells."

Manning said that flaring of gas may be expected to increase when oil starts flowing through the Trans-Mountain oil pipe line to the west coast from Edmonton this year. The gas, he said, will be wasted unless it is put into a distributing system.

"It is in the interests of the province," he contended, "that a market for gas be found, or it will be detrimental to both oil and gas development."

Manning pointed out that the Alberta Petroleum and Natural Gas Conservation Board has deferred further hearings on gas export until April 1.

Two groups interested . . . He said two groups are interested in piping Alberta gas east. One would build an all-Canadian line, and the other would string pipe to Winnipeg and then south to the Minnesota market.

The government's policy is expected to be further clarified when the legislature sits this year.

At present, export of gas from Alberta is limited to Pakowki field in the southern part of the province, from which a specific volume is authorized for Anaconda Copper Co. in Montana as a defense measure.

The province also has authorized export of gas from the Peace River district of northwestern Alberta, by West Coast Transmission Co. for the Vancouver, B. C., and Pacific Northwest market, but this has been held up pending permission for construction of a line from the U. S. Federal Power Commission.

Gas Rights Sold

EDMONTON, Alta.—A sale of natural-gas rights, first of its kind in Alberta, has netted the provincial government close to $700,000.

Previous sales have offered oil and gas rights, and returns from such sales in the past 6 years have yielded the Alberta government over $100,000,000.

The recent sale of gas rights alone was held because oil and gas companies have protested that reservations covering both petroleum and natural gas were unsuited for drilling for gas alone. Companies interested in drilling for gas said that previous reservations offered were suited only for companies interested in oil. Such parcels of land offered by the government, they said, were large enough for oil exploration but too small for gas.

In this recent gas-rights sale, Midwest Industrial Gas, Ltd., was the major purchaser, acquiring a 5,740-acre tract in the Fort Saskatchewan district for $554,101, and getting a 6,499-acre reservation in the same area for $100,100.

Canadian Line Operating

EDMONTON, Ont.—Canadian Gulf Pipe Line Co.'s new 115-mile crude-oil line from New Norway to Edmonton, Alta., Canada, has been completed and is in operation.

The 4, 6, 12-in. line extends from the Fenn-Big Valley-Stettler area to the Interprovincial Pipe Line Co. terminal at Edmonton.

Operation south of New Norway has not started pending completion of certain Interprovincial tankage needed for handling Stettler-type crudes. However, such storage is expected to be available this week and the whole line will then be placed in operation.

Construction on the pipe line was begun last summer and total construction cost was estimated at $5,000,000. Contractor was Anderson International Contractors.

Rotary Rigs in Operations Outside the U. S. and Canada*

(Communist countries excluded)

Country—	Jan. 1953	July 1952	Mar. 1948
North America:			
Alaska	2	0	2
Cuba	0	1	0
Mexico	80	80	37
Total	82	81	39
South America:			
Argentina	45	45	50
Bolivia	2	2	2
Brazil	5	5	5
Chile	5	5	4
Colombia	19	17	24
Ecuador	12	11	11
Paraguay	0	0	2
Peru	22	22	21
Trinidad	27	27	22
Venezuela	131	122	133
East. and Cent.	66	60	67
Western	65	62	66
Total	268	256	274
Europe:			
Denmark	3	3	1
British Isles	7	8	9
France	28	31	22
West Germany	95	95	80
Italy	24	20	15
Netherlands	4	4	4
Portugal	2	2	0
Spain	3	3	3
Total	166	166	134
Africa:			
Algeria	6	5	2
Egypt	1	2	8
Ethiopia	1	1	0
Madagascar	1	1	0
Mozambique	1	0	0
French Equatorial Africa	3	2	1
French Morocco	6	5	6
Nigeria	1	1	0
Tunisia	6	6	2
Total	26	23	19
Middle East:			
Bahrein	2	2	2
Iran	1	2	9
Iraq	11	11	6
Kuwait	5	4	9
Lebanon	1	0	1
Trucial Coast	0	1	0
Qatar	3	3	2
Saudi Arabia	10	9	7
Syria	0	0	3
Turkey	5	5	2
Total	38	37	41
Other Asia:			
Australia	1	2	2
Burma	2	2	2
Indonesia and Br. Borneo	31	31	21
India and Pakistan	10	9	12
Japan	7	6	4
New Guinea (East. & West.)	4	5	5
Philippines	1	0	1
Total	56	55	47
Grand total	636	618	554

*Partly estimated.

Rotary-Rig Survey

Check shows areas outside U. S., Canada running 636 rigs; 3,320 rotaries active in all parts of non-Communist world

Dahl M. Duff

ROTARY rigs in operation outside the United States and Canada now number approximately 636, a slight increase over the middle of last year and a substantial 15 per cent higher than the total during the "oil shortage" boom of early 1948.

The total of 636 in January of this year is shown in the accompanying tabulation which is based on currently available information and estimates in cases where exact figures were not readily obtainable.

This index of drilling activity reflects both development drilling in existing fields and the exploratory programs which are now under way in many areas of the free world. Even without exploratory work, an increasing volume of drilling is necessary to sustain current heavy production. In November of last year, non-Communist foreign production averaged nearly 5,100,000 bbl. daily as compared to about 3,350,000 bbl. daily in November 1948.

Rising trend . . . During the week ended January 26, 2,439 rigs were active in the United States, and 158 in western Canada. Thus, the total number of rigs operating throughout the non-Communist world during January amounted to approximately 3,320. The rising trend in the total of foreign rigs during the past year contrasts to that in the United States and western Canada where the January 26 week's total represented a drop of 282 rigs over the corresponding week in 1952.

South America active . . . Regionally, the area of greatest activity in foreign drilling is South America. The 268 rigs shown to be operating in South America during January represented nearly 42 per cent of the total for all foreign areas, excluding Canada. Venezuela, which makes up about half of the South American total, was reported to have 131 rigs in operation in January, 9 more than in July of last year.

Two developments may later cause a substantial increase in drilling in South America. One is the possibility of new concessions in Venezuela, a matter which has been under consideration in Caracas intermittently for nearly 2 years. Some industry officials now believe that the new government will go ahead and make awards some time this year.

The second area of probable increased drilling is Peru which recently has been granting concessions under the petroleum law passed early last year. A number of companies have taken acreage, and some geophysical data were obtained earlier. A half a dozen or more additional rigs may be running on exploratory operations in coastal Peru a year from now.

Western Europe . . . A surprisingly high number of rigs are active in western Europe. The bulk are in West Germany, the leading producing country, where a relatively large number of outfits are kept busy in field development. France is in the midst of a 10-year state-supported program to find more oil production. Most of the rigs operating in Italy are after gas production in the Po Valley. Some exploratory drilling is under way in southern Italy and in Sicily.

Africa . . . A great deal of exploratory interest is now being shown by major operators in the possibilities of developing production in Africa. Shell and several French companies are planning exploration in the Sarah Desert of southern Algeria. Sinclair, Conorada, Standard-Vacuum, Gulf, Shell, and Anglo-Iranian, all are involved in exploratory programs extending from Mozambique up through British Somaliland along the eastern part of the African Continent.

Middle East . . . Less than 40 rigs continue to be used in the Middle East

to support production which has been ranging up to nearly 2,200,000 bbl. daily. Some 94 per cent of this output comes from three countries, Iraq, Saudi Arabia, and Kuwait, which together have 26 rigs active, mostly drilling the high-productivity wells in existing fields.

Several programs have been abandoned or temporarily suspended in the Middle East. Iraq Petroleum Co., Ltd., has discontinued work in Syria, while the Neutral Zone and Trucial Coast programs are in abeyance. Shell is expected to drill in its new offshore Qatar concession later. The Lebanese wildcat now under way is reported being drilled by a United States independent with Lebanese participation.

Far East . . . The principal new areas of exploration in the Far East are New Guinea and Pakistan. Pakistan Petroleum (B.O.C.) is drilling in both East and West Pakistan, while the Anglo - Iranian, Standard - Vacuum-Oil Search group is moving into West Papua. The Caltex-Ampol wildcat in the northwest Cape area of western Australia is expected to be started soon. In British Borneo, Shell recently commenced its first platform offshore well in an effort to extend Seria field.

MIDDLE EAST

Crude Price Drops

Jersey cuts price for Middle East crude at export terminals 12 cents due to low tanker rates; Creole also trims postings

THE price for Middle East crude at eastern Mediterranean export terminals was dropped 12 cents February 5 by the Standard Oil Co. (N. J.) organization because of continued low tanker-freight rates.

The reduction from $2.41 to $2.29 for 36° to 36.9°-gravity crude was made by Esso Export Corp. It affects Kirkuk field (Iraq) crude at Tripoli, Lebanon, and Banias, Syria, and Saudi Arabian crude f.o.b. the Tapline terminal at Sidon, Lebanon.

Other f.o.b. suppliers of Middle East crude at the eastern Mediterranean were expected to follow suit immediately. Many of the contracts contain provisions for automatic reduction if the price is cut by another supplier. Socony-Vacuum Oil Co., Inc., has both Iraq and Saudi Arabian crude, while Caltex has a 60 per cent share of the Tapline throughput.

A price of $2.41 for crude delivered by pipe line at the eastern Mediterranean was first announced publicly by Socony-Vacuum when Tapline began functioning late in 1950. The same price was placed on Kirkuk crude at Tripoli. These postings, the only ones made for Middle East crude, are issued by Socony-Vacuum Overseas Supply Co.

The $2.41 price at the eastern Mediterranean represented a differential of 66 cents over the prevailing $1.75 f.o.b. Persian Gulf price. This 66 cents was the amount of the difference in tanker rates from the Persian Gulf and from the eastern Mediterranean. The basis was 2-year time-charter rates at the time.

Increase rescinded . . . When Socony-Vacuum sought to increase its posted price in April 1951 because of increasing tanker rates, other suppliers failed to follow, and the proposed 16½-cent increase was rescinded. The eastern Mediterranean price has remained at $2.41 since that time.

With the differential unchanged, the effect was that when the rates went higher, it was cheaper to lift at Sidon. Conversely, when the rates dropped, it was relatively costlier to buy at Sidon, and crude f.o.b. the Persian Gulf held the advantage. This advantage in favor of the Persian Gulf has become more and more apparent in recent months as tanker rates fell. The time-charter market used by the companies follows the general trend of the spot market, though its fluctuations are not so abrupt and violent.

The reduction made by Esso cuts the differential between the Persian Gulf and the eastern Mediterranean from 66 to 54 cents. When tanker rates were at about U.S.M.C. minus 2½ per cent, the 66-cent differential made the landed cost of crude in the United Kingdom the same from the two areas. The 54-cent differential equalizes the price on the basis of tanker rates at U.S.M.C. minus about 25 per cent. On the basis of a tanker rate of U.S.M.C. minus 25 per cent, Middle East crude lifted at Sidon at the posted $2.29 price can be landed in New York for about $3.08 a barrel, including the 10½-cent duty. Using the same level of tanker rates, the same crude can be lifted at Ras Tanura,

Foreign Guests of the New York Nomads

Among visitors at the New York Chapter of Nomads' party at the Stork Club recently were the following foreign guests, left to right: Al Thomas, Petroleum Service & Supply Co., Maracaibo, Venezuela; Andy Duarte, Construcciones Industriales, S.A., Caracas, Venezuela; Walter Butler, Importadora e Exportadora Robert Schasseur, Rio de Janeiro, Brazil; J. W. Des Champs, Lucey Export Corp., Buenos Aires, Argentina; George Pope, and Gordon Morgan, Creole Petroleum Corp., Venezuela; W. W. McCune, Iraq Petroleum Co., Ltd., Basrah, Iraq; and Samuel Schoelman, Petroleos Mexicanos, Mexico.

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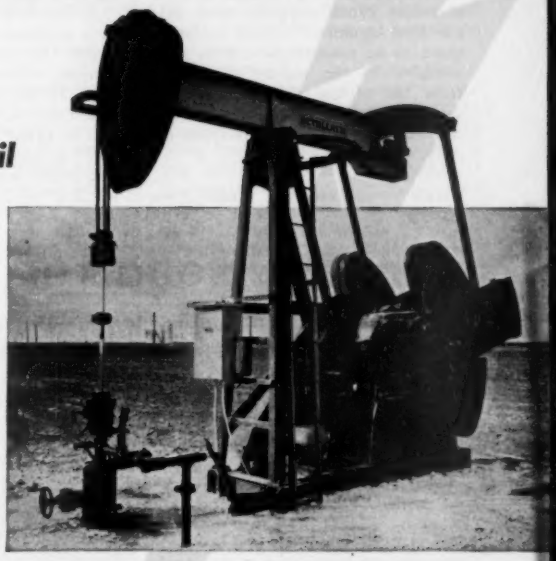

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The same is true of lease-electrification systems. For over a decade Bethlehem Supply engineers have designed and installed complete electrification plants ranging in size from small, simple layouts to very complex networks serving scores of wells. In determining plans and equipment, Bethlehem personnel will team up nicely with your own engineering staff; in every small detail, the turnkey job will be tailored to meet your needs.

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PUMPING UNITS. The proper Bethlehem size and type for each individual well, with time-clock operation usually recommended.

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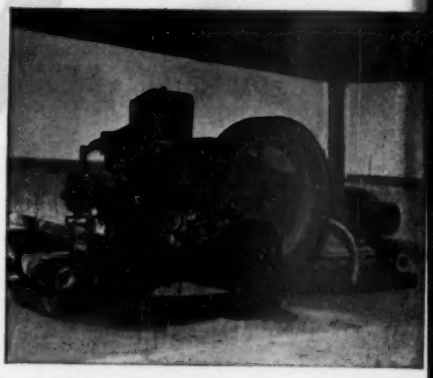

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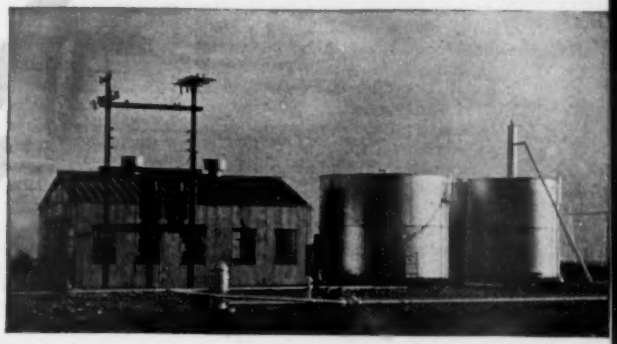


for example, in the Persian Gulf, and placed in New York for $3.11 a barrel, including duty.

Oversupply . . . The reduction made by Esso also comes at a time of overabundant crude supplies from Middle East countries. There is understood to be considerable excess crude available to the market. Production from the Middle East in December showed a drop of nearly 100,000 bbl. daily to approximately 2,081,000 bbl. daily.

Creole lowers prices . . . Other downward changes in foreign crude prices were posted by Creole Petroleum Corp., also effective February 5. They affected three grades of Venezuelan crudes and represented reductions ranging from 10 to 14 cents a barrel.

A Creole official said the changes were adjustments to bring these prices in line with those for other crudes. San Joaquin, a wax crude, was cut 10 cents to $2.81 for 42.0° to 42.9° gravity. Quiriquire, a heavy fuel crude, was cut 14 cents to $2.15 for 18.0° to 18.9° gravity. Temblador, also a heavy fuel crude, was cut 13 cents to $2.20 for 20.0° to 20.9° gravity.

Tankers Head for Abadan

Two more Italian ships will attempt movement of Iranian crude; "Miriella" nears Italy with cargo of fuel oil

THE current efforts to move oil out of Iran appeared last week to be broadening into a full-fledged movement by several small Italian tankers.

Two more tankers left Genoa while the Miriella neared Italy with a cargo of about 32,000 bbl. of Iranian fuel oil. The Miriella is expected to be confronted with court action by Anglo-Iranian Oil Co., Ltd., after it docks.

The 4,691-ton Italian tanker Recco left Genoa February 4 on what shipping circles reported was a voyage to Abadan. Five days later, another Italian tanker, the Carignano, steamed out of the port for the same destination.

The Miriella passed through the Suez Canal February 6 without interference from the British. Unusual precautions were taken by the captain to keep all visitors away from the vessel, and after leaving the canal, the ship maintained radio silence to avoid giving any information on its course and location.

All are independents . . . All these tankers are chartered by independent Italian interests which have worked out deals with the National Iranian Oil Co. for the export of oil from the nationalized properties of Anglo-Iranian. The Miriella was chartered by an oil-importing company of Rome known as Supor and is linked with a Genoa coal company, Consortio Carbonifero. The Miriella was chartered to Supor by another Italian oil company, whose president, Mario Bagdoglio, son of the Italian field marshal of World War II fame, died suddenly in Rome, February 10.

The first attempt to move oil out of Iran was in the Rose Mary, another Italian-chartered tanker. Last June the vessel was halted at Aden where a British court subsequently ruled the oil was the legal property of Anglo-Iranian. Last week this 5,700 bbl. cargo was on its way to Anglo-Iranian's refinery near Laverton, Australia, aboard the Anglo-Iranian tanker, British Prospector.

Reports circulated in Italy that the new movements of Iranian crude are backed by well-financed and influential Italian commercial interests and that they offer a much more serious prospect of continuing export. At first, it was reported Miriella's oil would be reshipped behind the Iron Curtain to Poland, but the Italian Government last week was understood to have informed the United States Government that this was not the case.

Two officials of the Italian company which made the export agreement with Iran said in Italy that voyage of the Miriella was nothing more than an ordinary business transaction, made after the principle of nationalization of the company's properties had been recognized by the World Court at The Hague and by the British Government itself. They said the rumors of sending the cargo to Poland were "absurd and artfully spread." They said a clause in their contract had called for the first shipment to take place before the end of January.

Next move up to British . . . As soon as the Miriella puts in at an Italian part, the next move will be up to Anglo-Iranian. The company has published world-wide warnings giving notice that it will exercise its legal claim to the oil. The only decision on its rights so far has been that in its favor by the British court at Aden.

Meanwhile, the diplomatic negotiations being conducted by the United States to settle the entire Iranian oil problem appeared to have bogged down with no outward sign that any progress is being made. The last known development indicated that Prime Minister Mossadegh was scheduled to receive a set of replies to the counter-proposals he had submitted.

Neutral Zone Tests Slated

American Independent Oil Co. and Pacific Western Oil Corp., coconcessionaries in the Kuwait-Saudi Arabian Neutral Zone in the Middle East, have agreed on a program for the drilling of two test wells, one to be located in the central portion of the zone and the other in the southwestern sector.

Both wells will be carried to a depth of 9,000 ft. unless production is obtained above that level. The companies have engaged Santa Fe Drilling Co. as drilling contractor. It is estimated that each of these wells will require about 90 days for completion.

The agreement on the new program follows the completion of a program of shallow structure-drilling which has just been completed. This supplements the seismograph work which was finished about a year ago.

The two companies each hold an undivided half interest in the oil rights in the zone, Pacific Western from the Saudi Arabian Government, and American Independent from Kuwait. The two companies first began drilling the zone December 12, 1949. The fifth well, Al Hazaim, located about midway along the coast, was bottomed dry at 7,429 ft. last spring. None of these tests were commercially productive.

AUSTRALIA

Oil Sands Found

Formations said promising in South Queensland test

AN Australian company has found what are reported to be promising oil sands in the latest exploratory effort in the Roma district in southern Queensland.

The company is Associated Australian Oilfields, which was formed late in 1951 by a consolidation of four smaller interests which had been operating in the Roma district several years.

The news of the company's find created considerably excitement in Australian circles, but in Sydney, Francis Clapp, the company's chairman, warned that "there is still a long way to go yet" to develop a commercial field. He pointed out that presence of commercial oil is yet to be proved.

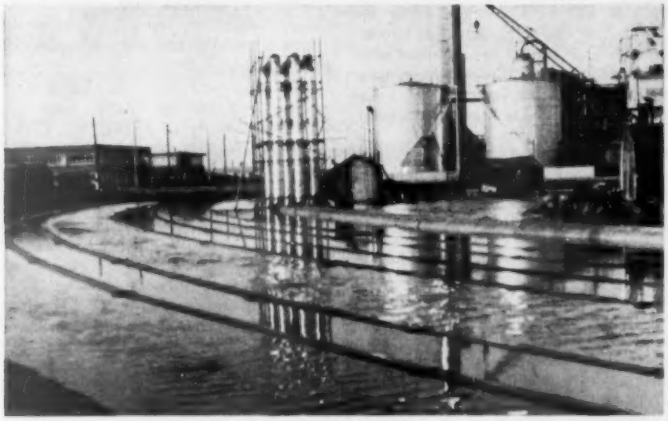
Near dry hole . . . The well was reported to be the company's No. 2 test.

It is located near a well drilled before the war by Roma Blocks Oil Co. and abandoned June 17, 1941. This well, located about 8 miles north of the town of Roma, hit basement at 3,655 ft. after passing through what were described as oil sands at three intervals from 3,497 and 3,545 ft. Actual thickness of these sand lenses was 9½ ft., and the top horizon was 24 in. Some high-gravity oil was obtained but none in commercial quantities. The formations are characterized by high lenticularity.

The Roma area has been the object of off-and-on exploratory interest since 1897 when natural gas was discovered in a water well. Various companies have been formed, and some drilling carried out but no commercial production ever found. In March of last year, gas blew out around the plug of an abandoned well and received wide publicity when it caught fire. This was the Warooby well which had been drilled in 1933.

Associated Australian Oilfields first began drilling in March of last year. The Mineral Resources Bureau of the Australian Government had been doing seismograph work in the area for about 4 years. The company's No. 1 well, located 6 miles east of Roma, went to 3,879 ft. and was abandoned when it hit basement rock.

EUROPE



PART OF the new Coryton refinery of Vacuum Oil Co., Ltd., on north bank of the Thames River in England under water. The pipe track is filled with flood water. In the background is the top of the turbo-generator building.

Plants Damaged

Unprecedented flood hit British, Dutch refineries

THE disastrous floods in western Europe early this month appear to have caused fairly extensive damage to two new refineries in southeastern England.

The two refineries on the estuary of the Thames River were both in the finishing stage of construction and were just beginning initial operations.

At the new Kent refinery of Anglo-Iranian Oil Co., Ltd., on Isle of Grain south of the river, all work was suspended when water covered the site. C. S. Cleverley, general manager, said damage would probably prove to be extensive, though no estimate could be made until the gaps in the sea walls were closed and the water removed. Tugboat service was established between nearby Chatham and the refinery to transport workers until the roads to the plant are cleared.

The floods struck the new Coryton refinery of Vacuum Oil Co., Ltd., less than a day after the plant had made its first deliveries of finished products. An inspection after the flood waters had subsided showed that none of the building foundations or the structure of any of the units had suffered serious damage. The problem faced by the company was mainly one of inspection of equipment, particularly motors and pumps, which in some cases may be repairable on the site.

The site of the new Coryton refinery on the north bank of the Thames opposite Canvey Island is protected by a sea wall constructed by the Dutch in the Seventeenth Century. It had never been known to have been breached since that time.

The recent floods made 14 gaps in the wall totaling 375 yd. along the main front of the Thames and up Shellhaven Creek. The refinery area was flooded to an average of 3 ft., though in places the flood waters reached 12 ft. Of 100 empty tanks at the refinery, only two are known to have lifted—the remainder containing crude and products are believed to be soundly on their bases and intact.

Action praised . . . The company management had high praise for the plant night shift which had only 15 minutes to close down the refinery when the sea wall was breached. It was pointed out that any escape of gasoline could have constituted a serious fire hazard on the river. Various units of the refinery commencing with the power plant had been coming successively into commission since December 31.

The floods also damaged the refinery of Bataafsche Petroleum Mij. at Pernis near Rotterdam in the Netherlands. The refinery was closed down, and producing operations in the eastern part of the country also were suspended, apparently as a result of the shutdown of the refinery which is the normal outlet for the crude.

The B. P. M. refinery is building up to a capacity of 167,500 bbl. daily and will become the largest in Europe. The Coryton refinery has a capacity of about 20,000 bbl. daily, while Anglo-Iranian's Kent refinery will have a processing capacity of 80,000 bbl. daily capacity.

Romania Tries Oil Officials

The serious internal difficulties plaguing the Communist-run oil industry of Romania erupted last week in a "trial" of 24 oil officials on charges of sabotaging the Ploesti fields.

The trial before a military tribunal at Ploesti was a typical Communist affair, and there was little doubt that it was being staged to whitewash the government's failures in oil production. The defendants pleaded guilty at the outset to the charges, including that of spying for the United States and Britain.

The defendants were mostly engineers and technicians but included a former Romanian finance minister. A report broadcast by Radio Moscow said the plot was carried out on instructions of Aug Kessler, a top Royal Dutch-Shell official, and involved R. P. Bolton, a Standard Oil Co. (N. J.) official.

In Rome, Bolton, now shareholders' representative for Jersey Standard in Italy, said the charges were the usual Communist accusations and completely untrue. The defendants represented most of the operating subsidiaries of the large western oil companies which

were formerly active in Romania. They are all Romanian nationals who were unable to leave the country when the Communists took control. Some have been in jail since 1948.

New German Strike Reported

Another oil discovery has been made in the Weser-Ems district of West Germany in a well about 5 miles north of West Hemmelte field.

The well, Molbergen 2, recovered 35 bbl. of 26°-gravity oil in 68 minutes on a drill-stem test of an Upper Jurassic section from 2,380-2,450 ft. It is on the large Oldenburg concession in which Gewerkschaft Brigitta (Shell and Jersey Standard) and Deutsche Vacuum (Socony-Vacuum) are jointly interested.

The operator is expected to continue drilling in order to test the lower horizons, including the Cornbrash sand of the Dogger formation. This latter is the main pay in the area.

West Hemmelte field was discovered in December 1951 by Brigitta and is also on the joint-interest property. The field now has 16 or 17 wells and has been producing around 1,100 bbl. daily.

LATIN AMERICA

New Totumal Well

Field test makes 400 bbl. daily; prospects boosted

THE International Petroleum Co., Ltd., has brought in a 400-bbl. well in Totumal field, Colombia, boosting prospects of the field. This is the third well in the area.

The field has had a somewhat spotty history thus far. Considerable excitement followed the original discovery in November 1951. This well flowed about 1,100 bbl. daily of 25°-gravity crude, and it was the first production from the Cretaceous in Colombia except in the Barco concession to the east.

Enthusiasm over the field dwindled off considerably last April when the company disclosed that the second well to be drilled turned out to be a small producer of around 75 bbl. daily of 33°-gravity oil. The No. 2 well, however, was north of a major fault and in a different structural segment.

Flow follows acidization . . . International's latest announcement said that the third well gaged 400 bbl. daily through a 3/8-in. choke and that this followed acidization of the Cretaceous lime and shale section. The company also reported that the No. 2 well is to be acidized in an effort to improve its production. The drilling program, he said, is continuing in the Totumal area. No. 3 is reported to be on the same side of the fault as the new discovery.

Last summer, International moved a new heavy rig into the area, and has been using its lighter equipment to take the hole to the top of the formation. The discovery well was drilled to 7,215 ft. and the test was made over a 475-ft. total section. The No. 2 well was drilled to 9,382 ft. and ran considerably lower.

Big concession . . . International, through its subsidiary, International Petroleum Co. of Colombia, holds approximately 500,000 acres in concessions in and around the Totumal area. The field itself is in the mid-Magdalena Valley about 75 miles north of International's former De Mares concession.

New areas obtained . . . International's announcement also noted that the company had acquired concessions totaling over 712,000 acres in the Sechura Desert area in Peru. It said 472,000 acres were uncontested, while the remaining 240,000 acres resulted from successful bidding at a recent auction held by the government for areas overlapped by applications of one or more of the 12 competitors seeking concessions in the Sechura region.

The Peruvian concessions which International has obtained were granted under the petroleum law passed early in 1952. The Sechura is a large area along Peru's northern coast and in the region of greatest interest, from a geological standpoint, and also because the coast location is accessible to export and domestic markets. The companies seeking concessions in the Sechura included International and three other American operators, Gulf, Richmond, and Conorada Petroleum Corp.

Cerro Bandera Gets Outlet

The new Cerro Bandera field in Argentina, considered the best discovery in the country last year, has been given a pipe-line outlet to Plaza Huincul about 18 miles to the east.

A 6-in. line is now reported to be in operation carrying 2,000 bbl. daily initially but with a full capacity of more than 10,000 bbl. daily.

Cerro Bandera, a seismograph prospect in the Territory of Neuquen, was drilled early last spring by Yaciemientos Petroliferos Fiscales, the Argentine Government oil agency. Sixteen wells were completed in the period between April and November, and pending construction of the line, the crude taken out by tank truck.

The crude comes from relatively shallow formations at around 540 m., or approximately 1,800 ft.

Ecuadorean Pipe Shipped

Line pipe is now in transit for the 46.1-mile, 6-in. "steepest inch" Ecuadorean products pipe line which will run from Bucay (elevation 1,017 ft.) to Palmira (elevation 10,860 ft.).

Preliminary construction work has already started and actual laying of the line will commence shortly. The line will carry gasoline, now being hauled by railroad tank cars, from Bucay "over the hump" to Palmira, where it will be transported to Quito, the capital city, by rail.

The line will have an initial capacity of 8,000 bbl. daily, with an ultimate capacity of 15,000 bbl. daily *(The Oil and Gas Journal, August 30, 1951, page 82).*

Lube-Oil Units Approved

The National Petroleum Council of Brazil has been authorized by the Brazilian Government to proceed with plans for the construction of lubricating-oil facilities at the Mataripe refinery in Bahia.

The refinery was built about 3 years ago by M. W. Kellogg Co. to operate on the indigenous production developed by the council in this area. A project to double the original 2,500-bbl. daily capacity to 5,000 bbl. daily was later undertaken with Kellogg, and this expansion is expected to be completed the latter part of this year.

The long-range program now contemplated provides for still another expansion later to a crude capacity of about 15,000 bbl. daily with the construction of additional distillation and cracking equipment. The lube plant will produce about 3,000 bbl. daily and thus sized for the eventual 15,000 bbl. daily refinery. Engineering for the 10,000 bbl. daily expansion is expected to go forward at the same time as engineering and purchasing of materials for the lube facilities.

The authorization given by President Getulio Vargas in Brazil allocated $12,500,000 for the project. Of this, $8,000,000 will go for technical studies and equipment, and another $4,500,000 for the contsruction of auxiliary services. The refinery is scheduled to produce about 3,700 bbl. daily in 1953 and 6,300 bbl. daily in 1956.

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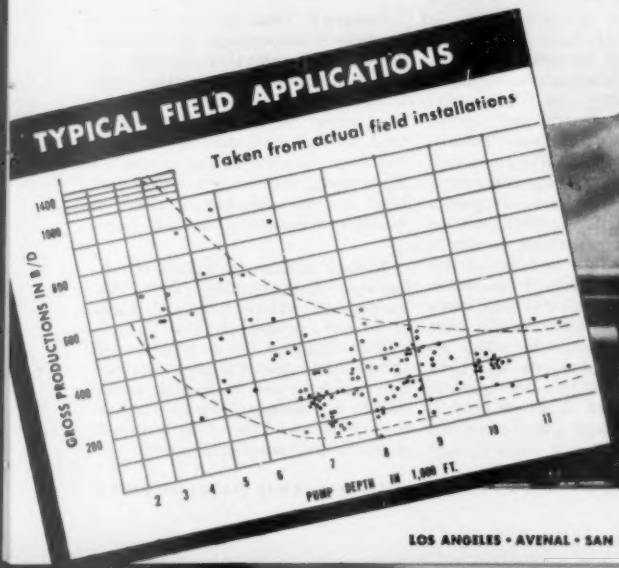

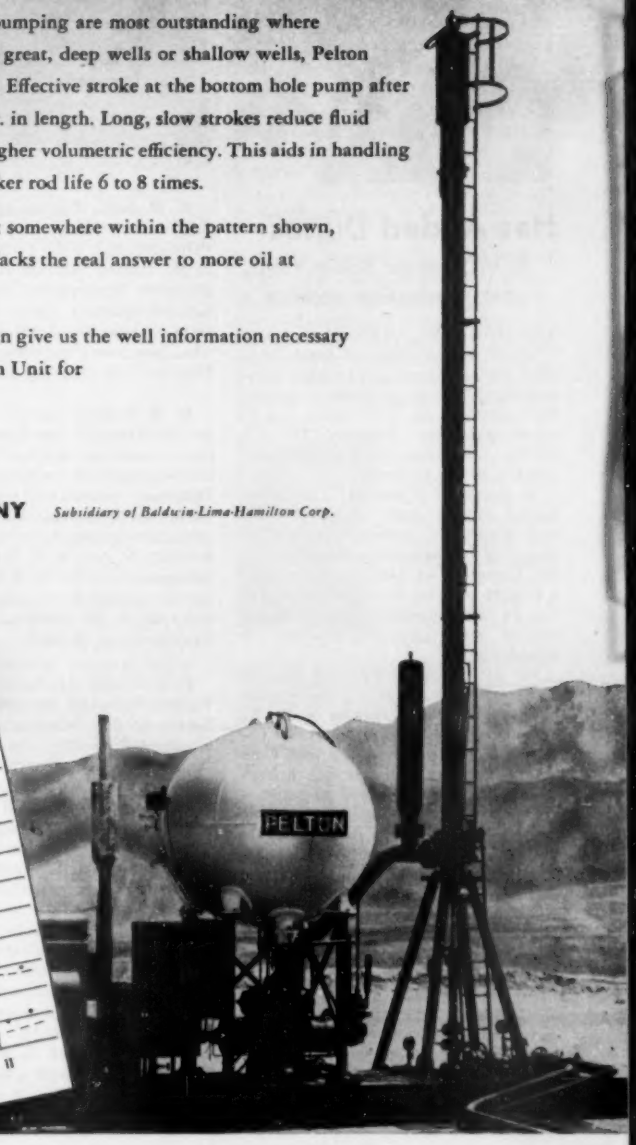

LOS ANGELES • AVENAL • SAN FRANCISCO • DALLAS • ODESSA • HOUSTON • NEW YORK • PHILADELPHIA

Has Added Duties

R. W. French, Sohio Veep, gets production position

RICHARD W. FRENCH of Cleveland, vice president of Sohio Petroleum Co., has been given added duties as general manager of crude-oil production activities for both Sohio and its parent company, Standard Oil Co. (Ohio). He plans to establish headquarters in the southwest.

A native of Colorado, French attended schools there and in Nevada and California before receiving his degree in mechanical engineering from the University of Delaware. Later, as a student engineer for General Electric Co. he took graduate training in advanced engineering and business administration.

He left General Electric to join the U. S. Army Air Corps as a flying cadet in 1930 and later became a second lieutenant in the active reserves. The following 10 years he spent with Continental Oil Co., where he rose through the ranks from roustabout to assistant manager of the production and drilling department.

French joined Sohio at Oklahoma City in 1947 as assistant to the vice president in charge of production operations and as chief engineer. In March 1948 he became assistant manager of production operations and 2 months later was elected vice president.

He also has done graduate study at the University of Southern California and attended the Advanced Management Program at Harvard University.

He has been active in the Production Division of the American Petroleum Institute, the American Institute of Mechanical Engineers, and in local groups.

Robert L. Schmidt has resigned from Sinclair Oil & Gas Co. to become division geophysicist for Forest Oil Corp. at Denver.

Julian W. Smith has resigned as chief geologist for E. A. Obering to open offices as a consultant at Mount Vernon, Ill.

John D. Bowers, district superintendent for Interstate Oil Pipeline Co. at St. Elmo, Ill., has been transferred to Wewoka, Okla., succeeding **G. S. Bancroft,** who has been transferred to Wilson, Okla.

R. B. Sale, director of training for Continental Oil Co.'s production department, has been promoted to the newly created position of director of executive development. He will move his headquarters from Ponca City, Okla., to Houston. A native of Denison, Tex., Sale joined the company in Ponca City in 1926 as a production clerk.

R. B. Cravens, production foreman for Shell Oil Co., has been transferred from Monahans, Tex., to Eunice, N. M. Other company transfers include: **C. R. Patterson,** production foreman, from Eunice to Monahans; **R. C. Gallaway,** subsurface geologist, from Midland to Roswell, N. M.; **V. E. Hartwig, E. R. Schroeder,** and **M. D. Wilson,** all subsurface geologists, transferred to Roswell, and **E. R. Scudday,** seismologist, transferred to Roswell.

F. E. Melott has been promoted to Wichita Falls area manager and **M. E. Forney** to San Antonio area manager for Deep Rock Oil Corp. The promotions resulted from expanded operations in these two offices. **William Ford,** formerly of the Tulsa production division, has been appointed economic assistant to **John L. Ferguson,** vice president. **R. B. Hurlbutt,** formerly in the Shreveport office, has been named assistant to the manager of the geological department in Tulsa. **John C. Meyer** has been transferred from the Midland, Tex., office to the new land and exploration area office in Bismarck, N. D., as area geologist. **I. S. Higginbotham** has been named area geologist and **J. L. Roach** a geologist in the new land and exploration area office in Tulsa.

R. J. Field has resigned as a senior geologist for Deep Rock Oil Corp. to do consulting work in the Rocky Mountain region.

John O. Allen, formerly district geologist for Bay Petroleum Corp. in Oklahoma City, has been named division geologist for Johnson & Gill, Fort Worth, at Oklahoma City. Prior to joining Bay he was with Creole Petroleum Corp. in Venezuela.

Col. Alexander A. MacNichol has been elected vice president and director of Crosby Oil Corp., Ltd., and will head the New York office. MacNichol also is president of the A. A. MacNichol Co. and vice president of MacNichol Packing Co., Eastport, Me.

F. B. STEWART

F. B. Stewart, district manager for Ohio Oil Co. at Sidney, Neb., has been named Terre Haute division manager. He will succeed **A. L. Henderson,** who will retire March 1. **J. S. Leonard,** Houston division drilling superintendent, has been appointed Sidney district manager, effective February 1.

J. F. Hellinghausen, West Texas drilling supervisor for Atlantic Refining Co., has been transferred from Midland to Tulsa as assistant production superintendent of the Oklahoma-Kansas region of the firm.

Norman F. Tietze has been promoted to division engineer in the products pipe-line department of Standard Oil Co. (Ind.) at Des Moines. He joined Standard in 1948 as an engineer and later served as district engineer. In 1952, during construction of the products pipe line from the company's Sugar Creek, Mo., refinery to Dubuque, Iowa, he was advanced to chief inspector of a section of the line.

William W. Clawson, Billings, Mont., has been elected president of Socony-Vacuum Exploration Co., an affiliate of Socony-Vacuum Oil Co., Inc., in western Canada. Other officers are: **H. R. Moorman,** Calgary, executive vice president; and **Walton H. Hohag** and **L. C. Stevens,** both of Calgary, vice presidents. These four men also constitute the board of directors.

PERSONALS

En Route to Western Australia

Daniel C. Lockwood (left) of C. F. Braun Co., and A. K. Brumbaugh and Frank Van Zytveld, both project engineers for Standard Vacuum Oil Co., are shown above before they boarded a plane for western Australia, where they will oversee construction of Stanvac's multimillion-dollar refinery. They will spend several months in Australia before returning to Los Angeles.

James H. Poteet has joined Felmont Oil Co., Owensboro, Ky., as chief geologist. He formerly was an independent consulting geologist in Evansville, Ind.

E. H. Wood, Jr., has been named to head the new district office of Warren-Bradshaw Exploration Co. at Wichita. He formerly was with Vickers Petroleum Co. in Wichita. The new office will handle activities in Kansas and the Julesburg basin.

Richard R. Evans, production engineer for Sunray Oil Corp., has been transferred from Yorktown, Tex., to Premont, Tex.

William F. Stebbins, Olney, Ill., superintendent of the Illinois division of Pure Transportation Co., has been appointed superintendent of the newly created Nebraska division. Stebbins, who has been with Pure for 14 years, will have offices in Sidney, Neb. **P. O. Hull,** Houston, division engineer with the transportation division, has been named to succeed Stebbins at Olney.

K. B. Ford, J. R. Butler & Co., has been named chairman of the Gulf Coast section of the American Institute of Mining & Metallurgical Engineers. Other officers are: **W. B. Hopkins,** Gulf Oil Corp., vice chairman, and **Pete W. Cawthon, Jr.,** City National Bank of Houston, secretary-treasurer. Named as directors were **W. F. Herbert,** The Texas Co.; **H. M. Krause,** Humble Oil & Refining Co.; **R. A. Bobo,** Phillips Petroleum Co.; **R. M. Darling,** Stanolind Oil & Gas Co.; and **George R. Gray,** Baroid sales division, National Lead Co.

H. A. Eklund has resigned as vice president and manager of western division operations of British-American Oil Producing Co. to become an independent producer. He will operate temporarily from his home in Arcadia, Okla.

W. S. S. Rodgers, chairman of the board of The Texas Co., has been elected chairman of the board of trustees of the National Safety Council.

Loren W. Dillard, district production foreman for Shell Oil Co., has been transferred from Oilfields to Bakersfield, Calif. Other company transfers involve: **Robert W. Fields,** geologist, transferred from Tucson, Ariz., to Grand Junction, Colo.; **Donald Meiss,** junior geologist, transferred from Casper, Wyo., to Billings, Mont.; **Joseph E. Flacy,** promoted from production foreman in the San Joaquin division at Oilfields to district production foreman; **Walter D. Larrick,** San Joaquin division safety engineer at Bakersfield, appointed production foreman there; **Boyd K. Vandeveer,** district production foreman, transferred from Bakersfield to Ventura, Calif.; and **John W. Zimrick,** production foreman, transferred from Ventura to Oilfields.

W. P. Simmons has resigned from the geological staff of Carter Oil Co. to become associated with **Joseph Teichman,** Wichita independent producer.

Dr. Donald Frederick Towse, associate professor of geology at the University of North Dakota, Grand Forks, is scheduled to receive the President's Award at the annual convention of the American Association of Petroleum Geologists in Houston March 24. The award, consisting of a certificate and $100 cash, is given annually to the author under age 35 whose article in the association bulletin of the preceding year is judged by the medal award committee as the most significant contribution to petroleum geology. The winning article is entitled, "Frontier Formation, Southwest Powder River Basin, Wyoming."

G. A. Plummer has been named West Texas district manager in charge of the new offices of Lone Star Gas Co. and Lone Star Producing Co. at Midland, Tex. Other personnel assigned there include: **Ernest J. Sneed,** production foreman; **Harry Otell,** production engineer; and **Lane Horstman,** geologist.

Gordon R. Henderson, Canadian petroleum engineer, has been appointed manager of the Sun Oil Co. refinery now under construction at Sarnia, Ont. Before joining Sun Henderson was vice president and general manager of Catalytic Construction of Canada, Ltd. Prior to that he was chief engineer for Polymer Corp. in Sarnia. Although operations at the Sarnia refinery are not scheduled to start until next fall, he will commence a study of company policies and practices and spend some time at Sun's refineries at Marcus Hook, Pa., and Toledo, Ohio.

Robert J. Riggs, formerly project engineer for Sunray Oil Corp. at the company's general office in Tulsa, has been named chief refinery engineer at the company's Duncan, Okla., refinery.

Dr. Herman Pines of Chicago has been named the first Ipatieff research professor at Northwestern University. The professorship, for research in organic chemistry, was established in De-

PERSONALS

cember 1952 by Universal Oil Products Co. in honor of the late Vladimir N. Ipatieff.

Sidney H. Smith, Jr., and **Herbert F. Goodenough** have formed Smith, Goodenough & Co., an engineering consulting firm at Corpus Christi for the natural-gas industry.

Clarence J. Kurz has been appointed vice president of National Refining Co., Cleveland. He joined the company 38 years ago as a salesman.

A. R. Neilson, district geologist, has been placed in charge of Socony-Vacuum Exploration Co.'s recently opened Edmonton office. He will be assisted by **A. D. M. Mason.** Both are University of Alberta graduates. Establishment of the office is part of a general decentralization move being carried out by Socony, which has operated mainly out of Calgary for the past 7 years.

Rear Adm. H. B. Miller has resigned as president of the National Committee for a Free Europe, effective February 28. He will resume his duties as director of the department of information of the American Petroleum Institute and executive director of the Oil Industry Information Committee, from which he had been granted leave of absence for a year.

M. S. Mainland has been appointed general manager of field and pipe-line operations of Iraq Petroleum Co., Ltd., in Iraq. His headquarters are in Kirkuk. The appointment of Mainland, who has been with I.P.C. since 1929, is part of a reorganization of company field management. **P. R. A. Ensor,** formerly deputy general manager in the Middle East, has been named general manager of pipe lines and terminals at Homs, Syria. **J. D. Graham,** formerly process superintendent, has been named divisional manager of pipe lines and terminals in Syria. **H. H. H. Chetwynd-Chatwin,** who since last March has been deputy pipe-line superintendent, has been appointed pipeline superintendent in Iraq. **E. Clough,** formerly deputy chief mechanical engineer of pipe-line operations, has been appointed pipe-line superintendent in Syria.

E. R. Smith has been appointed to the marketing coordination department of Standard Oil Co. (N. J.), as area contact representative for North American and Caribbean affiliates. He formerly was manager of marketing for Carter Oil Co.

Don Hockaday, division engineer for Kewanee Oil Co. at Shidler, Okla., has been promoted to production engineer at Tulsa.

Troy A. Shedd has been promoted to district superintendent, products pipeline department of Standard Oil Co. (Ind.) at Chillicothe, Mo. He will be in charge of Standard's present pipeline facilities from its Neodesha, Kans., refinery to Sugar Creek, Mo., as well as the new pipe line from Sugar Creek to Dubuque, Iowa.

Jack C. Norman, engineer for Amerada Petroleum Corp. at Houston, has been transferred to Big Lake, Tex., as a production engineer.

H. W. Anderson, Houston, president of Anderson Petroleum Transportation Co., has been elected a director of the American Waterways Operators, Inc.

DEATHS

Gerald Schrivenor Coburn, 69, who owned the Skelton-Moore Oil Co. until retiring 2 years ago, died in Bartlesville, Okla., February 3. He was a native of Belfast, Ireland, and came to this country in 1910.

Donald Blake Good, 42, supervising engineer for Texas Pipe Line Co., died February 6 at his home in Tulsa.

Joseph O. Lugar, 60, independent producer, died of a heart attack in Tulsa February 11. He retired about 6 years ago from Deep Rock Oil Corp. as assistant field superintendent.

John L. Dickson, 72, died February 6 at his home in Tulsa. He formerly was employed by H. F. Wilcox Oil Co. and later owned an oil royalties company until his retirement about 8 years ago.

Earl D. Egleston, 47, plant superintendent at the Milfay, Okla., natural-gasoline plant of Kerr-McGee Oil Industries, Inc., died January 27 in a Stroud, Okla., hospital.

Fred A. Wierum, 52, who had been employed in the materials department at Oklahoma City for Kerr-McGee Oil Industries, Inc., since June 1951, died there January 30. He joined Kerr-McGee in 1949 to serve as a materials supervisor for the Saudi Arabia-Kuwait Neutral Zone exploration project of American Independent Oil Co.

Leigh I. Dodwell, 72, independent oil operator, died February 4 at his home in Dallas. He went into semiretirement about 10 years ago but maintained contacts with several oil companies in the area.

Edward Pace, 47, Dallas independent operator, and his wife were killed instantly in an automobile accident near Mount Vernon, Mo., February 8.

Duncan E. H. Curry, 69, whose oil discovery 26 years ago is credited with opening Kettleman Hills field near Avenal, Calif., died February 5.

Murray C. Sells, 70, died February 8 in a Dallas hospital. He was president of Sells Petroleum, Inc., at Gladewater, Tex.

Gustavus Adolphus Axelson, 82, who with his brother founded Axelson Manufacturing Co., manufacturer of oil-well equipment, machine tools, and aircraft parts, died February 8 in Los Angeles.

Virgil Marshall, 56, general auditor for Skelly Oil Co., died in a Tulsa hospital February 10.

J. C. Truman, retired pipe-line construction contractor, died at El Dorado, Kans., February 11. He had been associated with Ray L. Smith in the firm of Truman & Smith at El Dorado.

William Beaser, 82, president of Whitmore Manufacturing Co., a lubricant manufacturing concern which he helped found in 1893, died February 2 in Cleveland.

Robert William Hisky, 54, branch manager for Parkersburg Rig & Reel Co. before he became ill about 4 years ago, died February 7 at Waco, Tex.

Roy Delmar Adams, 57, regional supervisor for Tide Water Associated Oil Co., died recently in Los Angeles.

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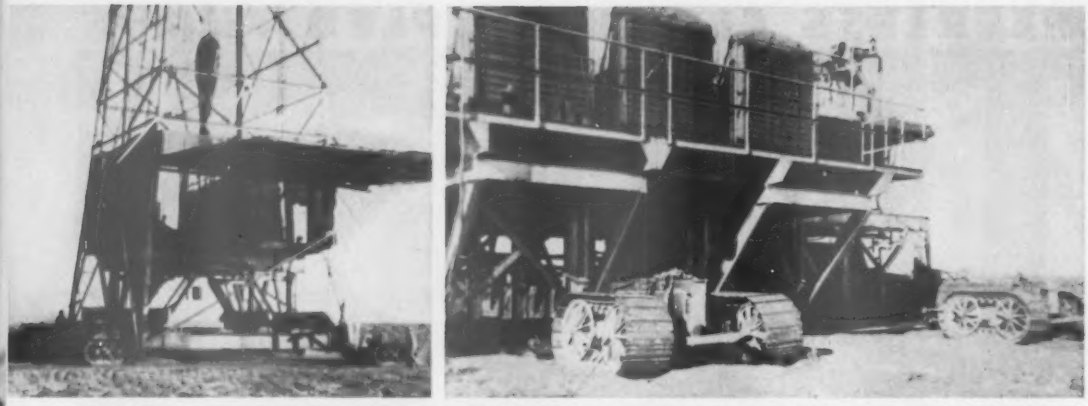


MOVING DAY IN WEST TEXAS... Revamped rig permits skidding in two sections. Section A at left is derrick with built-in floor substructure. Section B at right contains substructure for draw works and engines.

OPERATION SPEEDUP

Rig Skidded in 15 Minutes

Innovation in derrick construction minimizes operating vibrations; a separate section for draw-works substructure expedites skidding

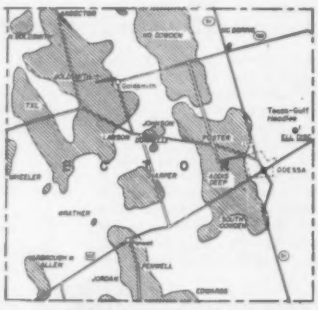
by Joseph A. Kornfeld
District Editor

REVAMPING of a standard 136-ft. steel derrick to accommodate 18-ft. leg extensions throws the weight on ground-level cross-supports, minimizes operating vibrations, and expedites skidding operations.

Exploration Drilling Co.'s Rig 12 was recently rearranged to form a 154-ft. steel derrick, as measured from crown block to sill level. Moreover, the floor substructure was arranged independent of the substructure supporting the draw works and engines permitting skidding in two sections. Last month this rig was skidded in only 15 minutes after Athey wagons were placed into position for moving; this took place from the new Ellenburger dolomite discovery oil well 4 miles northeast of Odessa in central-eastern Ector County, West Texas, to the north offset.

This new type of construction which isolates the derrick from the substructure and the draw works eliminates transmission of vibrations of the rig equipment to the derrick. Moreover, the arrangement permits division of the entire equipment into two sections for easy skidding. Thus the derrick with the builtin floor substructure is skidded in one section and the draw works, and engines in a second section.

Engine substructure . . . The substructure supporting the draw works and engines is a completely independent unit. It contains the water tank for the Dynamatic brake, a complete auxiliary unit with compressors, generators, and pumps; the mud-testing equipment; the pump-control manifold; and all piping for water, oil, air, and mud. Hose connections and hammer unions make for quick rig up and tear down.



PLACE-FIX MAP shows location of Texas Gulf Producing Co. 1 A. J. Headlee, new Ellenburger dolomite oil discovery in Ector County, West Texas. (Courtesy Midland Map Co., Midland, Tex.)

Draw works . . . The draw works is a Model 125 unit complete with Gyrol hydraulic couplings on each of the three engines.

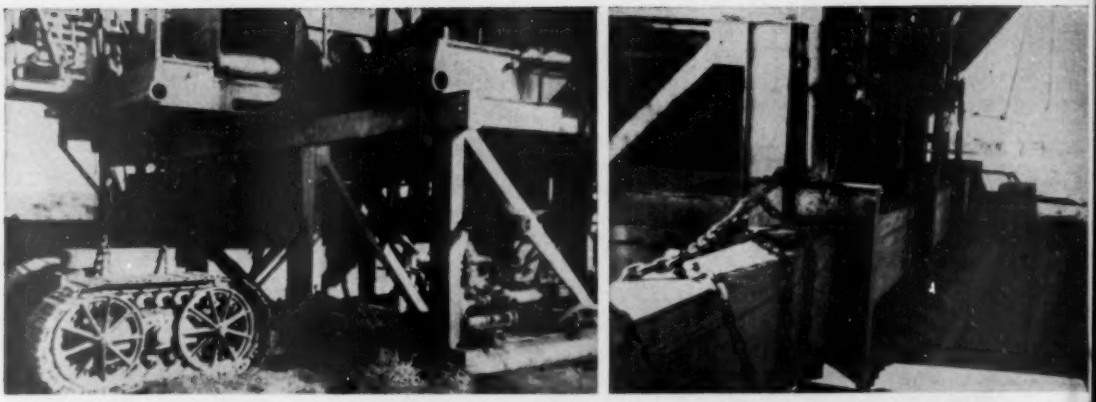
The rig is equipped with three PTD-8 dual-fuel engines burning diesel oil. These engines are eight-cylinder 8½ by 10½-in. medium-speed rated at 435 hp.

Pump equipment consists of two 7¾ by 18-in. pumps rated at 500 hp. each.

Mud system . . . Three steel mud pits with builtin manifolds, bottom-type mud guns, and dual vibrating shale shakers provide for efficient control of mud. A feature of the engine substructure is a well-equipped testing room which allows for convenient and proper testing of the mud and handling of formation samples.

Pipe-handling equipment . . . Equipment employed in handling pipe includes hydraulic controlled friction makeup cathead, air-operated friction breakout cathead, heavy-duty tongs, as well as slip-type casing elevators. Air-operated slips provide the utmost in speed and safety in handling long strings of drill pipe.

Drill pipe is 4½-in. internal flush Grade E quality.



READY FOR SKIDDING . . . Views of substructure with steel crossbeams supported on Athey wagons for skidding. At left is front view; back view is shown at right.

Surface hole . . . Crews cut a 17½-in. surface hole and set 375 ft. of 13⅜-in. pipe which was cemented with 350 sacks. The shoe was drilled with a 12¼-in. bit. Protection casing was 9⅝-in. pipe set at 5,336 ft. and cemented with 750 sacks.

Long hole . . . An 8¾-in. hole was cut to 13,106 ft. where the 5½-in. pipe was set and cemented with 600 sacks. Casing point was 30 ft. in the Ellenburger (Ordovician) dolomite encountered at 13,076 ft. The well was carried to a total depth of 13,317 ft. in saturated Ellenburger dolomite with no formation water.

After total depth was reached, a string of 2-in. tubing was run on a packer, the hole cleaned up with a treatment of mud acid, and the well swabbed into production.

PRIZE-WINNING CREW

Straight-hole drilling, shown in cutting Texas Gulf Producing Co. 1 A. J. Headlee within less than 1° to the Ellenburger, is the feat of the crew of Rig 12 of Exploration Drilling Co., of Tulsa. This crew also won the 1951 safety and rig-maintenance contest conducted by Exploration Drilling among its 14 rigs.

W. W. Hodges is tool pusher on Rig 12. Drillers are: C. C. Cravens, morning tour; Henry Yancey, day tour; and Eddie M. Farr, evening tour.

The American Association of Oilwell Drilling Contractors recently used this crew in filming a sequence on a motion picture relating to the care of drill pipe.

Drill-collar practice . . . After starting up under the surface pipe, in the discovery well at 375 ft., crews picked up twelve 8-in. by 30-ft. drill collars to cut the big hole of 12¼-in. size. When the 9⅝-in. protection pipe was landed and cemented at 5,336 ft., crews ran with the string eighteen 6¾-in. by 30-ft. drill collars to drill the remainder of the hole.

This drill-collar practice coupled with proper table speeds and weights on bit resulted in the drilling of a straight hole. With the exception of a swing to 1¼° at 6,500 ft. and to 3° in the interval from 11,500 to 11,700 ft. which is contained in the Devonian section, the hole was held to less than 1° throughout the drilling process, and the well was finished with a deviation of only ¾°.

Air pocket . . . An unexpected occurrence was the hitting of an air pocket at a depth of 1,987 ft., about 1,000 ft. above the top of the Yates sand in the discovery well. Rocks larger than full-grown cabbage heads were blown over the crown block. The blow, described by the crew as an explosion, exhausted itself within 18 hours. This pocket was not encountered in the 2 A. J. Headlee.

Testing . . . No coring was conducted in the discovery well. However, the formation contents were evaluated in a series of 22 drill-stem tests taken from the Spraberry formation on into the Ellenburger. Four of the tests were taken at levels in the Ellenburger ranging from 13,106 ft. (near the top) to 13,319 ft.

Eighty-one days were consumed from spudding until the top of the Devonian formation was encountered at 11,441 ft. However, a total of 159 days were used in the interval from moving in to moving off.

A total of 158 bits were used in drilling 1 A. J. Headlee. Bit performance is summarized in an accompanying table.

Revised Drilling Program

Exploration Drilling Co., of Tulsa, which drilled the discovery well for Texas Gulf Producing Co., the operator, has revised its bore-hole size program for the second well, 2 A. J. Headlee, two locations north of the discovery well. On the surface hole, con-

(Continued on page 141)

FORMATION MARKERS, TEXAS GULF PRODUCING CO. 1 A. J. HEADLEE

Section 8, Block 41, Township 2s, T&PRR Survey, Ector County, Texas

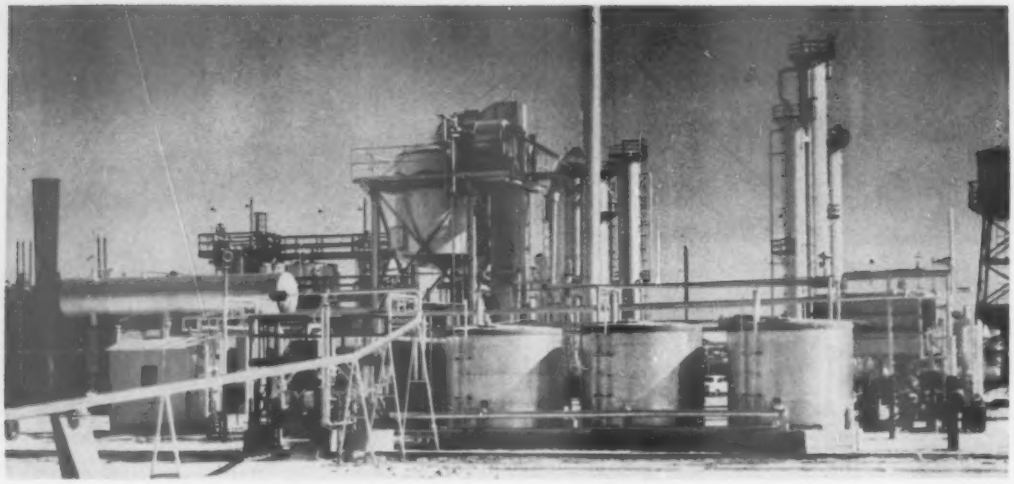
(Surface elev.: 2,914 ft. d.f.)

Anhydrite	1,740 ft.	(+ 1,174)
Yates	2,950 ft.	(— 36)
Spraberry	8,020 ft.	(— 5,106)
Devonian	11,463 ft.	(— 8,549)
Ellenburger	13,076 ft.	(—10,162)
Total depth	13,317 ft.	(—10,403)

BIT PERFORMANCE—I A. J. HEADLEE, ECTOR COUNTY, TEXAS

Bore-hole diameter (in.)	Interval drilled (ft.) From	To	Interval	No. of bits used	Average number of feet drilled per bit
17½	0	375	375	1	*375
12¼	375	5,336	4,961	18	275
8¾	5,336	13,106	7,700	139	†56

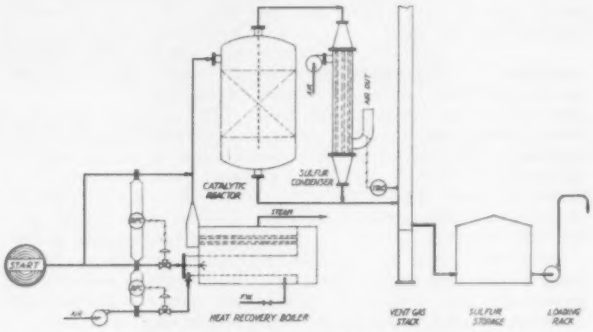
*Bit not completely worn after cutting surface hole. †Includes pulling 22 bits prior to conducting series of drill-stem tests.



NEW SULFUR UNIT at Sid Richardson Gasoline Co.'s Keystone plant located near Kermit, Tex. (Journal photo). The view of sulfur-recovery unit is from the rear with sulfur storage tanks showing in foreground.

PETROCHEM REPORT:

Sulfur-Recovery Plant at Keystone Has Capacity of 15 Tons Daily



PROCESS FLOW employed at Sid Richardson plant.

by D. H. Huff* and R. A. Graff†

LATEST addition to the fast-growing list of sulfur-recovery plants located in the Permian basin area is the Sid Richardson Gasoline Co. Keystone sulfur plant.

Only a few years ago sulfur recovery from waste hydrogen sulfide was a practically unknown process, in connection with gasoline-plant operation. Today, almost every gasoline plant or refinery, operating in a sour-gas or sour-crude area, has under consideration, construction, or in operation, a sulfur-recovery unit, operating in conjunction with an amine or phosphate-type hydrogen sulfide-removal system.

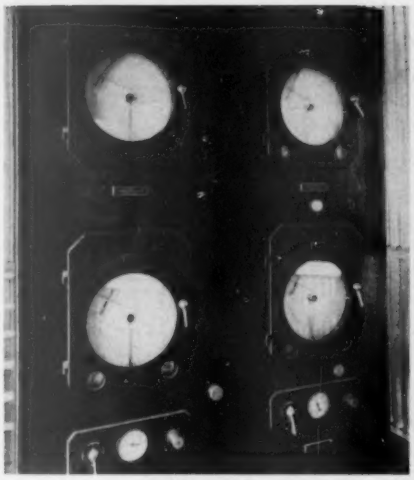
While early sulfur-recovery plants were designed as moderately large units, namely, 50-100 long tons per day, the most recent trend in plant design has been in the direction of units in the range of 5-30 long tons per day. The Sid Richardson Keystone sulfur plant has a design capacity of 15 long tons per day.

*Sid Richardson Gasoline Co., Kermit, Tex., and †Graff Engineering Co., Dallas.

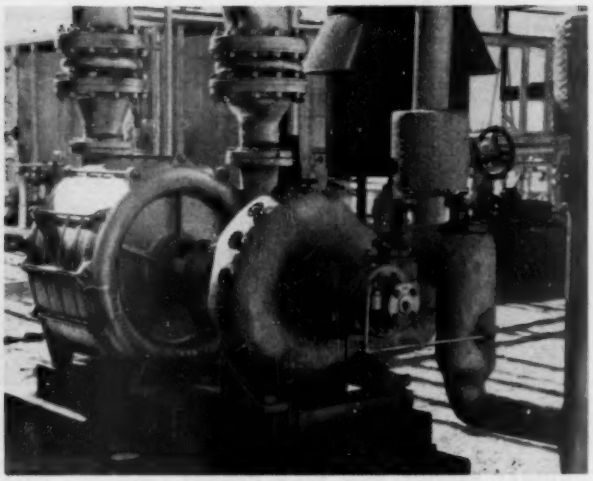
Sour-gas source . . . The source of the hydrogen sulfide-bearing gas for this Sid Richardson operation is a glycol-amine desulfurization unit; operating on the sour residue gas stream from the Keystone gasoline plant. This glycol-amine treating unit is located near the gasoline plant and is owned and operated by El Paso Natural Gas Co. It is not practical to operate the glycol-amine gas-treating plant regeneration system at superatmospheric pressure and, therefore, the waste gas from the treating unit is compressed to approximately 7 psig. by means of a positive displacement blower, and transferred by pipe line back to the Sid Richardson Keystone gasoline plant, where the sulfur-recovery unit is located.

The sulfur-recovery process utilized is quite similar to that employed at the Sid Richardson Carbon Co. plant, located near Odessa, Tex., and described in *The Oil and Gas Journal, April 21, 1952.*

Process plan . . . One-third of the total acid-gas stream entering the sulfur-recovery plant is burned under a steam boiler to produce sulfur dioxide. This sulfur dioxide is then reacted with the remainder of the hydrogen sulfide in a catalytic reactor to produce elemental sulfur and water vapor.



Part of instrument panel.



Combustion air blower.

The analysis of the acid gas feed to the unit is as follows:

Hydrogen sulfide	17-24 mol %
CH_4+	8-16 mol %
CO_2 and water vapor	Remainder

The hydrogen sulfide content of the feed gas to the unit is quite low when compared with other existing installations, and at times some difficulty is encountered in maintaining proper combustion conditions in the boiler, when both the hydrogen sulfide content and the methane plus content of the acid gas are simultaneously at minimum values. A small pilot flame using natural gas is used to insure sufficient heat release in the firebox to prevent the fire from going out or to relight the fire should the acid gas stream be momentarily stopped.

The relatively large proportion of hydrocarbons in the acid-gas stream feed to the unit, which seems to be a characteristic of the glycol-amine process, does not present a problem insofar as the over-all reaction is concerned. The hydrocarbons present in the one-third portion stream are burned with a slight excess of oxygen in the boiler firebox, and the remainder of the hydrocarbons introduced with the two-thirds portion of the acid gas stream is not subject to further reaction. This is due to the low temperature at which the catalytic conversion takes place. (575°-625° F.).

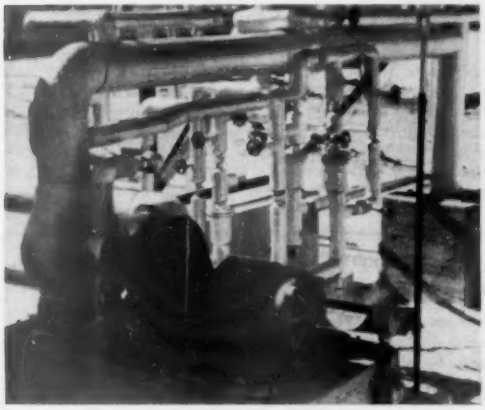
The catalyst employed for this operation is a naturally occurring high-iron-content bauxite, sized at 4/8 mesh.

The process flow diagram for the plant is shown in Fig. 1. Saturated steam at 150 psig., produced in the heat-recovery boiler by burning the one-third portion of the acid-gas stream, is utilized for the operation of steam turbines driving the process air blower, an air blower on the sulfur condenser, a fan on the exhaust steam condenser, and a condensate pump. Exhaust steam is condensed in a forced-draft, air-cooled extended-surface-type steam condenser.

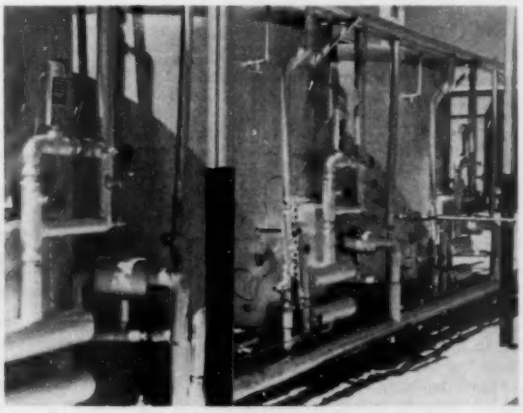
The sulfur vapor from the catalytic reactor is condensed in an air-cooled, tube-and-shell-type sulfur condenser, and condensed sulfur flows by gravity to three insulated 100-bbl.-capacity steam-heated sulfur-storage tanks, while uncondensed waste vapors from the sulfur condenser is vented to the atmosphere through a 60-ft.-high vent stack.

Other facilities . . . Boiler feed water

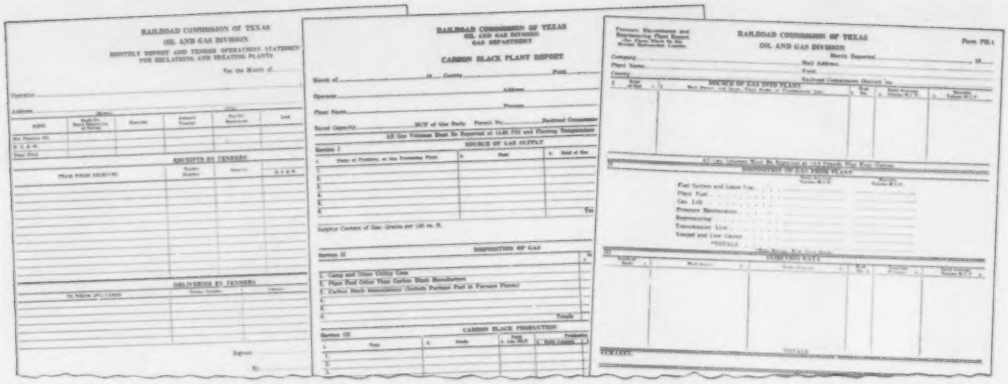
(Continued on page 152)



Sulfur-loading pump.



Sulfur-storage tanks.



TYPICAL FORMS used by the Texas Railroad Commission in its regulation of plants.

JOURNAL REPORT: How Texas Railroad Commission Operates; Its Rules, Regulations

5. PLANTS—Pressure Maintenance, Cycling, Reclaiming, Carbon Black

This is the final article in this series describing how the Texas Railroad Commission serves the oil business

by Roy F. Carlson
West Texas District Editor

SEVERAL other types of operations in the oil industry in Texas, in addition to those already reported on in this series, must also report their activities to the Railroad Commission through submission of reports. These are usually operations that are perhaps not as widespread as some of those discussed previously.

Among these reports is **Form RP-1**, a two-page report that accounts for oil that is reclaimed from tank bottoms, and includes volumes of pipe-line oil and b.s. and w., from whom such oil was received, and to whom it was delivered upon treating. The plant must also secure a permit to operate, and submit a certificate of compliance.

Pressure-maintenance and cycling plants are also required to submit reports of their operations. These plants are required to measure adequately all crude and condensate or other liquid hydrocarbons taken into the plant. Separate metering is required for all gas taken from statutory gas wells, all casing-head gas, all gas used for fuel, all gas taken by pipe lines and other domestic and commercial uses, all gas including flash vapor, vented directly or individually to the air, gas used for lifting water by jetting, or used in turbines and subsequently vented to the air or burned in a flare. No recycling plant is permitted to vent any gas taken from statutory gas wells except for 2 per cent.

No gas shall be used for plant use which is not burned in boilers, heaters or internal-combustion engines, and no raw gas or recycled gas shall be used for plant fuel if any flash vapors are being vented or flared.

Repressuring and pressure-maintenance plants are defined as any equipment or device used for the purpose of returning gas to underground oil reservoirs.

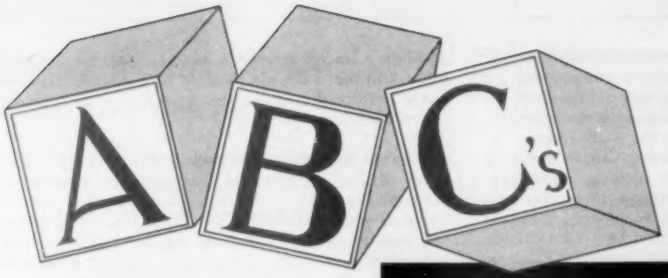
Form PM-1 must be filed by all these plants where no liquid hydrocarbons are recovered, and where a reallocation of oil allowables has been permitted for oil wells used as injection wells, or where specifically required by the Railroad Commission. This form does not include gas injected from gas processing plants.

Carbon-black plants are limited in the kind of gas that they can take for conversion into black. Originally, carbon-black plants were regulated under Rule 41 of the Railroad Commission rules, but this was later abrogated and replaced by another order. This order forbids manufacture of carbon black from natural gas without first removing the natural-gasoline content, and forbids use of sweet gas produced from a gas well for manufacture of black, unless at least 5 lb. of black is recovered per 1,000 cu. ft. of gas.

And sour gas can be used for black manufacture only if at least 1 lb. of black is removed per 1,000 cu. ft. of gas and when its gasoline content is removed. If the gas is first used for gas-lifting purposes in amounts in excess of 10,000 cu. ft. per barrel of oil, the gas in excess of 10,000 cu. ft. per barrel may be burned for carbon black provided that the natural gasoline is removed prior to burning. Permission is required from the commission, however, to use more than 10,000 cu. ft. per barrel for gas lift.

FREE REPRINTS OF "A B C'S OF SUPERVISION"

Because of the important reference value and educational services made available in this special article, The Oil and Gas Journal, P.O. Box 1260, Tulsa, Okla., will send you a reprint free on request. And write, Attention, Editorial Department, whether you liked this material . . . and how it is of value to you.



# of SUPERVISION

How to instruct

Make sure he knows how

Training never stops

Don't pass the buck

Delegate responsibility

Planning a technique

Establish fair standards

Analyze total job

Sell your idea—don't force it

Remember—employes are people

Allocation of personnel

Editor's Note:

Whether you are a company president, junior engineer, foreman, driller, or line employe, we recommend this article for your attention. Providing good supervision is one of the most important aspects of any company's operations.

The Journal presents this section in cooperation with Business Management Service, College of Commerce and Business Administration, University of Illinois. (From Bus. Mgm. Serv. Bull. 601.)

LEADERSHIP Based on COOPERATION

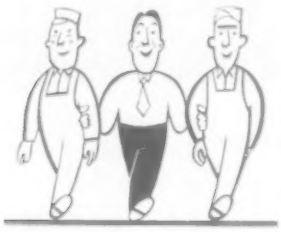
MOST problems of "getting it done" in the oil business can be reduced to a series of relatively simple tasks if the supervisor is able to get the full and enthusiastic cooperation of every employe. There can be very little place in the petroleum industry for the supervisor who must always do the whole job by himself. His job **is being a leader**—getting things done through the efforts of others.

To attain this end the supervisor must base his leadership on cooperation. Most employes want to do their share—and more. It is the task of the leader to organize work to **allow** full and effective effort. To get enthusiastic cooperation and complete application of skills and abilities, the supervisor must lead each employe as an individual. Each employe is a different person and must be managed in terms of the factors important to **him.**

Man management is a difficult job. There are no shortcuts or magic formulas which will solve the problems of handling people for you. The successful management of people requires only that you learn to **handle** yourself.

To develop group cooperation and job enthusiasm in the worker the supervisor must plan his work, give his orders, and provide training so as to appeal to the interests of the individual. Such tailor-made individualized supervision requires that the supervisor **know each employe** personally. Close study of, and genuine interest in, your employes will enable you to take your place as a leader and discard the rough-shod methods of the "boss." The boss can get work done only at the **expense of the worker.** The leader gets more work done and **develops the worker** in the process. Which method do you use?

Since the primary job of the modern supervisor is the development of people, it follows that most of his time is spent in training his employes. His role as an instructor is obvious when introducing a new employe to the job or when developing the skills needed to perform this new job. But training should not stop there. Actually, every time he corrects a mistake, handles a grievance, gives a reprimand, or handles any other worker problem on the job, the supervisor should be instructing—continuing the training. TRAINING NEVER STOPS.



Off to the Right Start

Surveys give conclusive evidence that the causes of most turnover can be traced to events of the first few days new employes are on the job. The highest rate of turnover occurs in the first 30 days. There are many reasons why this is true. Most of them can be traced directly to supervisory failure. The supervisor should remember that the new employe represents an investment of approximately $300 by the time he gets into full production. This money is spent in selecting, hiring, and training procedures. In view of this investment the new employe should be **"handled with care."**

When the new employe walks in the office door, or onto the rig or into the refinery, he offers a challenge to the supervisor. The supervisor, as well as the new man, is on trial. The first hours or days on the new job are **critical.** First impressions don't wait! You can build an enthusiastic, loyal, productive worker—or lay a foundation for bad habits and attitudes, and tear down initiative and morale. Which course the new worker will follow depends on the induction methods used at the start. Remember, events of the first few days on a new job are indelible.

Good Procedure to "Open"

The following procedure is offered as one way to make sure that you fulfill your responsibility.

1. Greet him cordially . . . You can overdo this step; be sure you mean it—are sincere. Don't "sugar-coat" your greeting. Convince him that **he is exactly the person** you wanted for this job.

2. Show a sincere interest in him . . . Sell him on your interest in him. Inquire into his background. Get advance information from the personnel office before the new worker reports.

3. Explain the part he will play . . . Explain the importance of his work in the operation or department. Describe the work of the department. Explain the relation of your operation to other departments. Explain the department rules. Inform him of traditions and high standards of the department. Answer questions; give him some background. Stress the importance of safety.

4. Show him around . . . Explain time clocks, rest rooms, first aid, and other special services or features. Show him his work area, equipment, facilities, his station or desk. Acquaint him with telephones, files, and storerooms.

5. Introduce him to fellow employes . . . Make the introduction personal. Give both parties some background on each other's experience, job, etc. Introduce him, at first, only to those with whom he will work directly—too many introductions cause confusion. See that the older employes show sincere interest in him and the department. Job enthusiasm is contagious.

6. Select the right man to instruct him . . . Give him a definite job assignment and make sure he understands it. Explain the importance of initial training. In those cases where you don't do the initial instruction personally, explain why you have chosen this particular instructor. Inform him of other assistance available (books, manuals, training facilities, etc.). Don't leave this training to chance.

7. Follow up. Don't forget him . . . Frequent followup in the first days will insure friendly relationship. **Schedule** several such visits. Avoid the appearance of spying. Send him home the first night sold on his job and his fellow employes.

Training and Job Instruction

IF YOU HAVE PROBLEMS OF:

Waste and material spoilage.
Tool or equipment breakage.
Accidents or near accidents.
Low quality of work.
Inefficient job methods.
Low output per worker.
Dissatisfied employes.
High turnover or absentee rates.

THEN—TRAINING WILL HELP YOU!

Why training? . . . Every new employe must be tailored to fit a new position. This tailoring of training to meet job specifications will vary, depending on the amount of experience the worker has had in related activities. No matter what degree of skill is shown, the training period should not be overlooked.

This training is not only the supervisor's responsibility, but is an opportunity as well. It is his chance to be sure that the habits and attitudes formed in the

induction period are strengthened and emphasized.

Too often the training given new employes consists of a 5-minute session of "do's and don'ts" or orders to "sit around and watch until you catch on." Neither method results in efficient learning and both are costly in time and money. If an employe learns to do the job right in the first place he gains confidence, likes his job, gets up to standard rapidly, and makes the supervisor's job much easier.

If teaching steps are followed in order, the task of training workers can be accomplished rapidly and effectively. The method can be applied whether instructing one person or a group—whether training is in a classroom or on the job.

Before Starting Job Instruction

If the supervisor takes time to **plan** job instruction before he starts, learning is easy and rapid. There are five important points to check before you start instruction. These are:

1. Plan the instruction—
Be sure you know:
What information and skill the learner needs.
How much time can be used.
Who should get the instruction.

2. Schedule the instruction—
Have a time table requiring definite periods of instruction for each job to be learned.
Follow this schedule.

3. Break down the jobs—
List **all** operations and key points to be learned. Arrange these in learning order.
List tools, materials, and new trade terms used.

4. Have everything ready—
Be sure that tools, materials, and training aids used in instruction are at hand.

5. Arrange the work place—
If instruction can't be given on the job, try to duplicate actual job conditions.
Set examples for good housekeeping habits.

How to Instruct

When plans are complete the actual instruction can begin. If learning is to be efficient the supervisor must remember that there is more to instructing than just showing the learner how to do the job.

The four-step method of instruction will help you teach and make learning easy for the employe. Follow this method:

Step 1: Prepare the Employe for Learning

Take time to put him at ease, arouse his interest in the job, and sell its importance.

Relate the job to be learned to his background. Make him anxious to learn.

Step 2: Present the Job—Set a "Pattern" For the Learner

Tell and explain, illustrate and demonstrate. Encourage the learner to ask questions.

Present the job clearly and slowly—ONE STEP AT A TIME.

Stress the key points; explain new terms and new tools.

Follow the job breakdown. Don't try to teach too much at once.

Use magazine articles and reprints, sample jobs, pictures, and other training aids.

Step 3: Let him TRY OUT

Have the learner perform the job under close supervision.

Check his mistakes.

Ask questions—make **him** explain **how**—make sure he knows WHY.

Make suggestions for improvement — don't tear him apart.

Remember—we learn best by DOING.

Step 4: Make Sure He Knows How

Put the learner on his own—**but,** tell him where to go for information.

Check back with him frequently.

Offer encouragement, praise, and further tips.

Help him to meet the work standards.

Build his confidence in his own ability.

Training Aids

YOU can do a more effective training job if you employ training aids. A training aid is anything which demonstrates or dramatizes ideas and thus makes it easier for the learner to understand—graphs, charts, pictures, trade magazines, mock-ups, working models, and maps, as well as more elaborate devices such as slides, film strips, and motion pictures. We often depend too much on words alone—written or spoken.

Man used pictures to put across long before he invented the alphabet. And although he learned how to speak before he learned to draw pictures, he's found that appealing to the eye and to the ear simultaneously is more effective than either by itself.

A training aid, properly designed and presented, does more than add interest or "sparkle" to a speech. It should be a **planned** part of the training program. It is not used to relieve boredom, but to put across important, key points, or to explain complex situations or processes which the speaker cannot do in words alone. A training aid capitalizes on the opportunity of using every faculty the listener has for absorbing the subject.

The movies prove to you how harmoniously the eye can work with the ear to grasp meanings. But it doesn't necessarily take a movie: simpler devices can be as effective—such as a series of charts mounted on an easel, pictures from books or magazines projected by an opaque projector, or even a blackboard diagram. Sometimes they can be more effective than moving pictures, depending on what you are trying to put across.

Experts in the use of visual aids have found, for instance, that slides and film strips often do a better teaching job than the movies that have so far been developed. The idea is that your best teaching bet is to use every sensory avenue possible. Your message is clearer, stronger, more interesting—and, it's easier for you to put across. This is particularly true with people you'll be training.

How to Use Them

When you use training aids, be sure that whatever you present can be clearly seen, read, and grasped. Give your learners adequate opportunity and time to get the meaning of the visual aid you are showing. It's exasperating for persons to be unable to read charts because the type is too small, if a graph is too complex and cluttered to be understood easily, or if the shift from one training aid to another is so rapid that the material can't be properly understood.

If the training aid is important enough, use it more than once. The same speech repeated is too tiring to be worth anything, but we are always ready to look at good pictures two or three times. If you have carefully tied the training aid in with your discussion of the subject, the aids can be presented for the second or third time in their sequence with only a comment to remind the learners how they fit into the subject. Or, only the key aids can be given a second showing with fill-in comment.

Test the retention of training aids material in the same way that you test retention of other materials. This is easy to do if your visual aids are a real part of your instructional program.

Key Points in Learning

The supervisor should remember that: We **learn best** what we **like best.** We try harder **for rewards** than we do **because of punishment** (praise goes farther than blame). We learn by DOING — listening or watching alone are not enough. We remember longer if we understand "why." Teaching is making it easier for the learner to learn.

If the worker doesn't learn—YOU haven't taught.

Giving Orders That Are Carried Out

Training never stops! The experienced supervisor knows that he continues the training process in almost every contact with his subordinates. This is particularly true in giving orders. Every order given properly results in more learning—poor orders destroy good work habits.

Employes judge a supervisor on his ability to give "good" orders more than on any other supervisory function. Giving orders properly is therefore of primary importance. If proper methods are used, respect and confidence are increased and morale and job enthusiasm strengthened.

When You Give an Order, Remember

Orders must be **planned** in advance—

Who — What — Where — Why — When — How.

Break complex orders down into simple steps—
Keep them simple and don't give too many.

Be sure the order allows some initiative—
Build and strengthen your subordinates.

Be sure **he** can carry it out—
Give the order to the right person.

Be sure the employe **understands** the order—
Ask for a repeat—Explain—Demonstrate—Show.

Prepare the employe in advance—Sell your order—
Explain "why"—Get **cooperation,** not submission.

After you give the order—**Keep your hands off—**
Delegate authority needed—Let him do the job.

Set reasonable deadlines—and require compliance—
Follow up—Don't forget him.

And Finally, Remember

You are giving orders to people, not machines. Tailor-make each order to fit the person.

Developing Initiative

Competent workmen able to use controlled initiative are MADE, not born. Good ideas are there, in the heads of people, and it is your job to tap the source.

Suggestion and incentive plans will help unlock the door, but the job of stimulating and encouraging idea development is primarily the supervisor's.

The following plan will help build initiative in your people:

First—Give several orders with obvious steps omitted. Check to see that the employe caught the omissions.

Then—Give several orders with less obvious points omitted. Check and commend.

Later—Give an order outlining only the **general** ideas. Check and commend.

Still later—Give an order as a suggestion. Check and commend.

Finally—Watch for spontaneous accomplishment or suggestions. Commend and encourage.

Correcting Mistakes

The experienced supervisor makes allowances for occasional mistakes, failures to carry out orders, or substandard work. He is quick to turn these occasions into opportunities for continued training. When a reprimand is necessary it is turned into a constructive, **learning** situation which builds confidence, ability, and respect.

Faced by the same situation, the poor supervisor uses the occasion to "blow off steam" and show off his authority by "bawling out" the offender. The bawl-out is completely negative, destroys confidence and ability, and leaves the employe beaten and discouraged.

Examination shows that:

THE BAWL-OUT

1. Is seldom based on facts.
2. Is done in anger—under emotional strain.
3. Is done in public.
4. Combines sarcasm, threats, and strong language.
5. Is used to display authority or power.
6. Is nearly always unjust.
7. Stifles initiative—discourages the employe.
8. Is used to blow off steam at the employe's expense.
9. Destroys morale of other workers.

The supervisor who corrects mistakes by means of

THE REPRIMAND

1. Makes sure of **all** the facts.
2. Makes sure it is deserved.
3. Cools off—is not upset emotionally.
4. Talks to the offender **alone**—in private.
5. Talks straight and does not mince words.
6. Acts as an instructor, shows how to improve.
7. Builds initiative and encourages new effort.
8. Leaves the worker anxious to improve.
9. Directs the employe in a positive manner.

Your job is building people, not tearing them down. The reprimand, used properly, is one of your most effective tools. It is a positive training device—a means of building lasting respect and cooperation.

The next time you are tempted to bawl out an employe, sit down and cool off and remember the last time **you** were bawled out. That should help to convince you that the reprimand is the best means of improving your people and of building morale.

Reducing Reprimands

Mistakes must be corrected properly, but it is even more necessary to prevent reprimand situations from arising. The fewer reprimands given—the better the supervisor. To keep reprimands at a minimum:

Give credit when due.

Make sure orders are understood.

Instruct completely—explain "why."

Plan work in advance.

Sell your plans in terms of the individual.

Grievances

As long as people are allowed to think for themselves there are certain to be differences of opinion. That's healthy. It is through these differences that our democracy has flourished. These differences also give rise to grievances among employes. Under our system of government the employe has a right to "get it off his chest" when something bothers him about his job.

There are two basic methods for handling grievances when they arise. The supervisor can assert his authority—and he becomes a dictator. On the other hand, he can turn the gripe or complaint into a chance to help the employe by using human, individualized, **democratic** methods. The first method destroys confidence, lowers morale, and leaves the employe resentful and dissatisfied. The second builds respect and confidence, and leaves the employe satisfied and cooperative. Which method do you use?

When an employe comes to you with a grievance, whether real or imaginary:

Try this procedure:

1. Listen sympathetically—let him get it off his chest.
2. Get **all** the facts—not just **one** side of the story.
3. Look for the story behind the story.
4. Make, or get, a decision.
5. Notify the employe of action taken.
6. Sell your solution—don't pass the buck.
7. Follow up—be sure promises are kept.

If this method is used whenever a grievance arises, fewer will develop.

To reduce the number of grievances still further.

1. Know your employe—be easy to approach.
2. Take care of the little things.
3. Sell plans in advance.
4. Be liberal with praise.

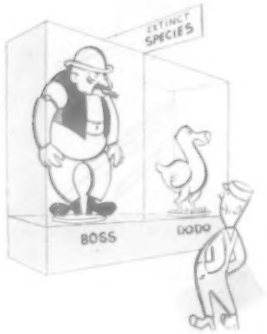
TO SUMMARIZE

When the modern leader is compared to the old-time boss, it is found that his leadership has its basis in cooperation and mutual trust, not coercion and fear. His approach to problems is POSITIVE, not negative. Every reprimand, grievance or other personnel

problem offers a challenge—an opportunity to train and develop better and more enthusiastic workers.

You as a petroleum supervisor occupy a position of trust and responsibility. Every mistake corrected by a bawl-out, every grievance left unsettled, every training opportunity overlooked or mishandled lowers morale, destroys confidence, and raises absentee and turnover rates.

You hire the whole man—Employes are PEOPLE! To be a good supervisor requires a genuine interest in your employes. When you hire a person you hire all of him—his problems at home, his quarrels with his wife, his hopes and plans for the future—not just the 8 hours he puts in for you each day. To manage people you must know people. To give orders in terms of their interests means you must be aware of the details of their lives. Everyone works harder on a task which is his "own idea." When a person feels he will benefit by doing a good job he is interested and cooperative. Identity of interest is cooperation. Work toward that end.



We do best that which we like best. We like those jobs which result in satisfaction of accomplishment and in praise and credit for jobs well done. Credit and praise are the paving stones on the road to job enthusiasm and pride in work. Use them generously but with discrimination.

Individualized supervision . . . Employes work harmoniously and well for a supervisor who keeps their respect. Respect depends primarily upon judgment. Since your judgment is displayed only when decisions are made, you must make each decision in terms of ALL the facts. Never act on half-truths or one side of the story, or make snap judgments—then you will build a reputation for judgment and fairness. You will gain the **respect** of your workers. To keep this respect—DON'T PASS THE BUCK!

Morale and job enthusiasm are the vitamins from which employes obtain their nourishment and develop into valuable, skilled employes. Morale and job enthusiasm can only be defined in terms of the job. Where new employes are inducted properly, where time is taken for training, where reprimands and grievances are handled properly, and where initiative is encouraged and developed—there, also, is high morale and job enthusiasm. They follow, invariably, when proper methods of handling and training are employed.

Successful man management requires:

Interest in people
Detailed knowledge of each person
Giving credit where due
Getting and acting on FACTS
A positive, not a negative, approach to problems
Leadership, not dictatorship
Continual instruction
Individualized supervision
Courage to act after arriving at the proper decision

and the constant reminder that **Training Never Stops!**

Job Management

Supervisor's Responsibility is Threefold:

1. Job know-how
2. Management
3. Training

OPERATING a rotary rig, setting a pumping unit, or reworking a heat exchanger all require special knowledge and skill. So does the job of supervision, whose contribution to the finished "product" (whether the product is an oil-well completion, a revamped oil distillation tower, or a new pipe-line station) is indirect but essential.

You wouldn't start a new man into one of these jobs, or radically shift a trained man into a wholly different setup—**not without special training.** Without the special knowledge that is required, this would be costly—in dollars and in good will. Untrained supervisors can be equally expensive. Supervision is a trade, occupation, or profession just as much as any other job in merchandising, production, or service—and the knowledge and techniques of supervision must somehow be learned.

The job of supervision can be divided into three distinct activities: (1) managing the actual job to be done, (2) handling the people on that job, and (3) training those people so they can do the job the way you want it done. Specific techniques must be applied in each field, but all three—job management, handling people, and training—are interrelated.

The purpose of a supervisory job is primarily the development and direction of **people;** secondly, the direction of **things.** All the problems of management ultimately resolve themselves into problems concerning people, and the answers will be found in one of the three fields of the science of man-job management. That is why a knowledge of all three fields is necessary if a supervisor is to perform his job.

For example, a high accident rate on a rotary drilling rig may be ascribed, on first glance, to the lack of safety guards on machines. Dealing with **things,** rather than people? No, because the machines aren't dangerous except in terms of the **people** on the drilling rig. Machines haven't been equipped with guards because some **person** in a responsible position didn't recognize the need—again, here is a problem in terms of people.

Furthermore, a high accident rate in a plant may be due to the presence of an **accident-prone** individual. It has been shown that some people will be in-

volved in accidents again and again regardless of circumstances. **Things** may be partly responsible, but there it's almost entirely a problem concerning **people.** That's also the case where a group of employes are almost constantly irritated by the presence of an **anger-prone** individual, or confused by a **mismanagement-prone** coworker.

Although these pronounced types are rare, many people **tend** in one of those directions: they are careless, they get angry, they mismanage a detail now and then. A supervisory problem which doesn't involve people is hard to imagine—the choice between materials or machines may deal exclusively with things; but finally, the great bulk of problems which face the supervisor involve human elements. He must deal with individuals, and each one presents a supervisory problem which can be solved only by a knowledge of the techniques of handling and training people.

In another phase of his job, the supervisor represents management—he **is** a manager. He must, therefore, face the problem of costs. By analyzing the two main sources of cost—material and labor—into separate items, the foreman finds that there are ways in which he can control costs directly. By additional training he may be able to reduce the man-hour cost in the production of an item. By improved organization, he may be able to take on more work with no increase in personnel, thus reducing the total production cost. These solutions to cost problems are based on the worker, not on the machine, and can be found in the field of job management.

The first thing a good foreman must know is how to **manage his job**—to know the skills and techniques included in the first field of the trade of supervision. Management is a broad term, but it can be defined by listing the five definite functions of a supervisor:

The Supervisor

HE MUST ORGANIZE
HE MUST PLAN
HE MUST DIRECT
HE MUST COORDINATE
HE MUST CONTROL

The profession of supervision has three major responsibilities: handling people, management, training. The key to successful discharge of these responsibilities is: The development of people.

Organization

ORGANIZATION is necessary when any effort to reach a goal requires the services of more than one person. Group effort requires plans; and methods for carrying out these plans must be developed. Such methods or procedures **are** organization. They will include such factors as position descriptions, channels of authority, and assignments of positions.

There are four fundamental principles of organization. These principles must be understood and followed in order to organize any group effort successfully. (1) unit of command, (2) span of control, (3) homogeneous assignment, and (4) delegation of responsibility with the proper authority, are the basis for every solid organization.

is there more than one boss?

Unity of command . . . The principle of unity of command means simply that if an individual is to do a good job, he must have only **one** boss. When one employe has two or more supervisors, confusion and inefficiency will result. This means that a worker must know who is his boss and who is not; and that once a supervisor has delegated authority to another supervisor who is subordinate to him, he can no longer give orders to any employe reporting to that subordinate supervisor.

Span of control . . . The principle of span of control defines the number of employes a supervisor can control efficiently. There is a limit to the number of human relationships which one person can comprehend; and there is a limit to one person's time and energy. For these reasons, there must be a limit to the number of individuals responsible to one supervisor. These limits depend upon the type of work done, the duration of the jobs being performed, the geographic distance involved.

The more complex the work, the longer time it takes to complete the work; the farther from the supervisor the employe is located—the fewer employes there can be under one man. Ideally, no supervisor should control more than 7 to 12 employes. He should control not fewer than three because of the danger of oversupervising a few people.

Homogeneous assignment . . . Homogeneous assignment means only that any employe must have **a job** to do. He must know what his area of work includes, and that area must involve only related jobs; and his assignments must all fall within that area. There is no efficiency in miscellaneous jobs. It is a supervisory

assign only related duties

responsibility to develop people skilled in their particular assignments, rather than "jacks of all trades." A man who knows exactly what his job is and is trained to do it well is enthusiastic and proud of his work. The morale of a man who does "anything for everyone" is not high.

Delegation of responsibility and authority . . . The supervisor at every level has the responsibility for the work that is done and the authority to get it done. In the last analysis, the success of his group depends on him. But if the group is well organized and the span of control limited, responsibility and authority will be **delegated** to the lowest possible level. The unit chiefs who become responsible for the performance of certain duties must also have the authority necessary to carry them out. Proper delegation will speed up production by spreading the supervisory load and will develop initiative and leadership.

It is a supervisory responsibility not only to make such delegations, but to train subordinates to accept them. Train your unit chiefs to come to you **with** decisions, not **for** them. Give a man a job to do, be sure that he can do it, then leave him alone.

More on Organization

Learning the basic principles of organization is not enough; these principles must also be applied in building the organizational structure itself. A sound organization is built by always keeping in mind the purpose of the organization, by applying the four basic laws named above (unity of command, span of control, homogeneous assignment, and delegation of responsibility with authority), and by planning objectively rather than from a personal point of view. There are three steps that must be followed in planning an organization. They must be followed in the order given.

Position analysis . . . List all the jobs necessary to accomplish the functions of the unit, and then arrange them in groups, each "group" making up a position. (Limits must be set as to the number of jobs to be included in a position. Experience has suggested that a range of 3 to 12 jobs insures variety but guards against overcomplicating any one position). After the positions have been defined, those which include the major functions must be identified by titles. The remaining positions must be combined into related groups.

delegate responsibility with authority

Setting up structure . . . Arrange the various positions and groups of positions into the pattern which will give the greatest efficiency. Select whichever of the three following patterns best fits the needs, then follow it consistently.

Line . . . A line organization is the best structure for a small production or manufacturing unit. Each position is directly related to the positions above it through regular channels of authority.

Staff . . . A staff organization is the best structure for a small hospital or research laboratory where the relationships between positions are purely advisory. Each man is an expert in his field, and it is his job to give assistance to other staff members, not orders.

Line staff . . . Line staff is the most common type of organization. Larger industries find that it is necessary to combine both types. The majority of positions will be productive and are related by direct lines of authority, but they will rely on staff units for assistance and advice.

An organization chart, correctly used, is a device which is of great use to any supervisor. It will help to set up a new unit, and it will reflect any weaknesses in an existing organization. Violations of span of control, unit of command, etc., are easily recognizable.

Allocation of personnel . . . Allocation, or assignment, of personnel must be strictly impersonal if best results are to be obtained. This allocation cannot be impartial unless it is the last step in organizing.

A job must never be built around a man. Always consider first the job to be done. To select the right man for the right job, the qualifications of the man must be compared with the requirements of the position as defined. Techniques which will aid in selection are interviews, trial assignments, and evaluation of experience and training.

A man must always be fitted to the job. A new employe must either be trained to perform unfamiliar duties satisfactorily or must be reassigned to a more familiar area of work. The man, not the job, should be changed.

These three steps are not just theory. They are, if followed objectively and in order, the only practical basis for an efficient organization.

Planning

A FOREMAN who has neither a general plan nor a plan for each day's work is shirking his job of supervision. The history of wars, the rise and fall of big and little businesses, even your experience with family picnics, prove that the **planned** activity is always the most successful. As a supervisor, learn **how** to plan, then carry out your plan.

Planning is a technique that involves several steps:

1. Decide on a major goal. Know what you want to do. Be sure to include in this major objective everything you want to accomplish in a given time.

2. What's your job for this week, or today? Provide yourself with a measuring stick for your immediate goal.

3. Outline the detail plans necessary to accomplish this immediate objective. If you have to complete 150

Here's another reason why

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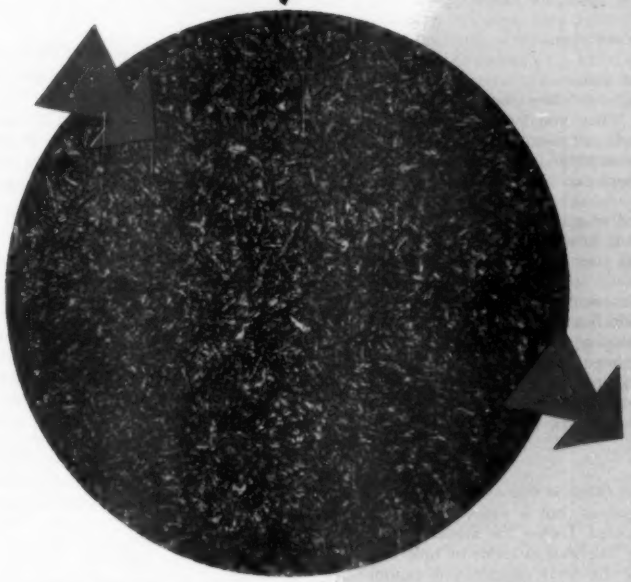
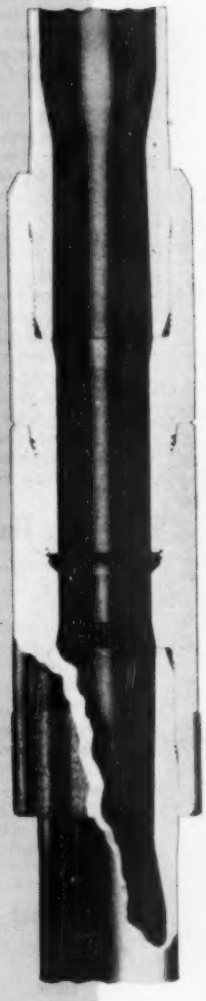
last longer!





This photomicrograph of a steel specimen from a **REED** Tool Joint means little to most people—but an internationally famous steel company said, "It is one of the most perfectly heat treated . . . one of the most homogeneously tempered martensitic structures . . ." they had ever seen.

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items this week, 25 today, how do you go about it? In detail planning, seven steps should be followed:

a. Define the problem. (What's your goal?)

b. Collect all pertinent data. (Get all the facts about what you have to do, your working tools, available personnel, etc.).

c. Classify the data. (Decide what is important and what is less important, what has to be done first, second, third, etc.).

d. Weigh the **pros** and **cons** of this data. (What factors are in your favor; what are the problems to be overcome?)

e. Make up a proposed plan.

f. Test the plan.

g. Put the plan into action.

But it is not enough to follow the skeleton technique of plan-making. When you learn to use a new tool, you learn also tricks, short-cuts, and the dangers you must avoid. So, remember:

—to use devices such as tickler files and summary sheets.

—to use unique and unusual approaches.

—to use the advice of subordinates.

—to sell the plan to your group before you put it into action.

—to follow the plan once you have made it.

—to make plans which are plastic, not static, to keep up with changing situations.

—to balance plans, not to emphasize one phase of work too much.

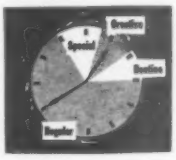
—A plan is a means to an end, not an end in itself.

Budgeting Time

TIME budgeting is not listed as one of the five basic functions of management, but is necessary if they are to be properly executed. Unless the numerous details and small jobs are balanced in terms of time and importance, balance of the total organization cannot be achieved.

The average supervisor tends to do the jobs he likes and "not have the time" for those he dislikes. This **costs** time, and since time is actually money, it is a dollars-and-cents loss. Large totals of lost man hours come from the failure of many individuals to balance work properly.

Time must be budgeted just as money is. Budgeting means that you must know how much time you have, and for what it is needed. So, before you budget,



analyze your duties. Four general classifications will cover all jobs. These classes, and the approximate percentage of time that should be allowed for each are as follows:

1. Routine (correspondence, record keeping, etc.)—10 per cent.
2. Regular (interviews, tour of department, etc.)—65 per cent.
3. Special (equipment, changes, etc.)—15 per cent.
4. Creative (research, training, etc.)—10 per cent.

The jobs classed as routine and regular, ordinarily consume the average supervisor's entire day. These are necessary, but the special and creative jobs will pay the most dividends. Such techniques as delegation of responsibility, plans, and budgets will help you to **make** time for these jobs.

Time budgeting will point out critical duties which need special emphasis, will develop an ability to plan, and will allow time for creative work and for the analysis of the training needs of workers.

Time can be budgeted and controlled systematically as follows:

1. Analyze the total job and list all its details.

2. Weigh the detailed jobs in terms of necessity and time and establish as system of priorities.

3. Classify these jobs under the categories of routine, regular, special, and creative. If one of the categories is empty, look for the jobs you have left out.

4. Set up a schedule for the working day which fits these classified jobs.

5. Follow this schedule.

Creative jobs are the most difficult to classify and the most important to a supervisor. Look for them. Time spent on training, developing new procedures, building morale, planning, and evaluating work, can change the face of an entire section and put its leader in line for a promotion.

The valuable man is the one who does a little more than his job requires. He can do this by using budgets, by scheduling activities, by following a regular program of training and studying, and by the use of devices such as work analyses, tickler files, and control devices. Of all of these, persistence in a budgeting program is the most important.

Directing

THE function of directing is the spark plug of supervision. It gets the organization started. Directing "sets going and keeps going the services defined by planning and established by organization." But giving orders is too often interpreted as the main function of a supervisor. Remember, an order should not be given without planning, and it cannot be successful without organization, coordination, control, and a knowledge of handling people.

No order can be given until a decision has been reached. The supervisor must base these orders on impersonal decisions, not on snap judgments or rule of thumb. The steps in analysis outlined in the discussion of planning are the basis for such decisions, and the following factors must be kept in mind:

1. Do not base decisions on doubtful material.
2. Gather all the facts—the correct facts.
3. Reconsider every decision that tends to lower the employe's respect for his supervisor.
4. In making each decision consider the "human element."
5. Be sure the decision is one that you should be making.

Sell your idea . . . After the decision is made, give the order. Written orders are nearly always more accurately followed than verbal orders and will produce bet-

ter results. When verbal orders are necessary, be careful that they are given and received accurately. Remember, a verbal order may be altered by word of mouth while a written order is always the same.

Give orders in terms of the people who will receive them. Do not be autocratic. Sell the idea before you give the order. An order telling a man what to do is better procedure than telling a man what not to do. Personal contact is the essence of direction, since supervision is "man management." The way in which an order will be carried out depends largely upon how it is accepted by the group.

To fulfill successfully the responsibility of direction, you must:

Know your job.

Know the facts.

Know your people.

Be sure that your orders **can** be carried out.

Give orders properly.

Be sure they **are** carried out.

Coordination

YOU have made a plan, you have an organization and the power to direct, but these alone will not guarantee successful supervision. Your organization must work together. The details of your plan and your orders must all be related to each other. Therefore, coordination is recognized as an important function.

The functions of management are interdependent, but coordination affects the total group effort more than any other single function. Primarily, coordination is a balancing agent. Having made sure that your plan is one which your organization can handle, you coordinate the work by making sure that every order relates to the objective and the plan of work, that it is given correctly, and that it is carried out. Coordination insures "having the right man to do the job at the right place at the right time." The efforts of a group of individuals must be geared together just as the thousands of parts in an aircraft engine.

Ordinarily, as an oil supervisor, you will have to plan two types of coordination: vertical and horizontal. All levels of management must work together. You must know that your plans and the work of your subordinates fit the general objective of your superior and of his superior. This is vertical coordination. All departments on the same level must also work together. This is horizontal coordination.

People are not born with a "talent" for coordination. Just as the champion boxer learns muscular coordination, the efficient supervisor learns to increase his production by using definite methods to coordinate the work of his employes, of related employes, and of his department with other departments.

The root of coordination is good planning, but additional techniques should be used. Records and reports designed to reveal information (not to make work) are invaluable. Organization charts and routing schedules are tools for planning coordinated effort. Finally, conferences and advisory committees are a check on how well individuals are actually working together.

Coordination is not a job to be left to the production manager or to a production control section. For each unit the supervisor is the coordinator.

Control

CONTROL has a direct effect on all functions of management. As supervisor, you must know how well your unit is working; control systems are your only means of finding out whether you are doing an effective job.

But control is commonly misinterpreted. It does not mean spying on individuals or having a check-up of your workers. **Control is the objective inspection of a job.** If an objective control system shows adequate production the supervisor knows that he is exercising all the functions of management.

A control system is a technique, not a haphazard guess. A successful system will include several factors:

1. Fair standards for comparison of quality and quantity of work.

2. Devices to obtain accurate and proper facts which show actual accomplishment.

3. Assurance that the devices selected will be effective in checking a particular job.

4. A system of checking, which will cover the total job, to indicate not only what has been done, but what must be done.

There are many devices which aid the supervisor to control his organization—and himself. They are valuable if properly used, but there is danger in overuse. Too many supervisors over-control. Their files are stuffed with unused papers and reports. Using these aids wisely and with discretion helps, but such devices will not do the job. Always require only what you use, and use what you require.

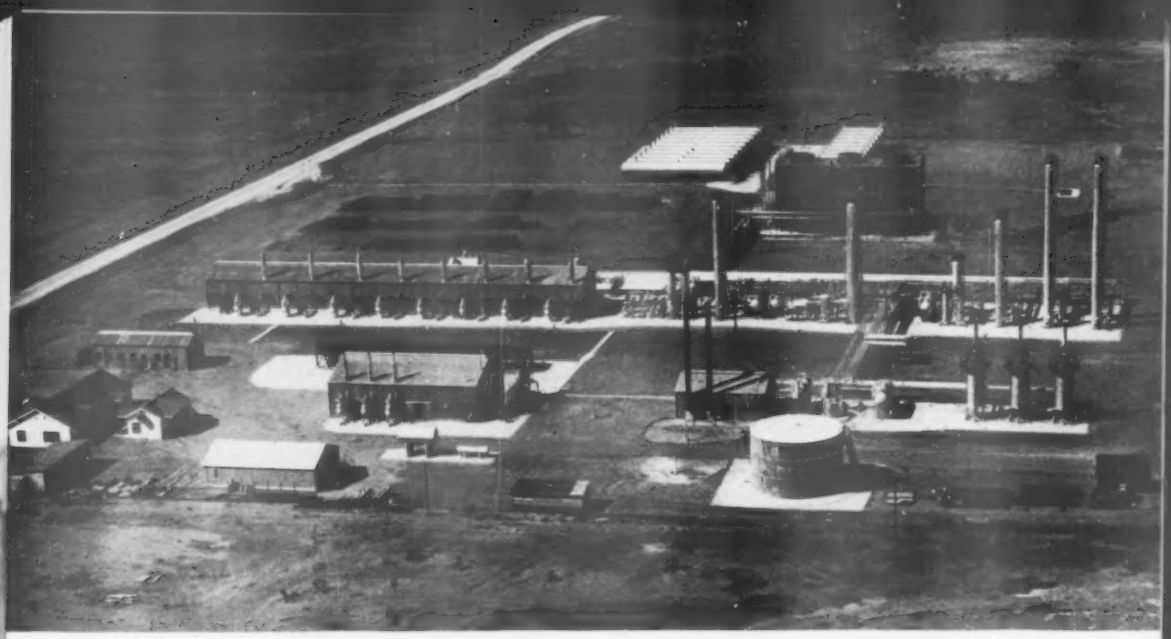
Standards

THE establishment of fair standards of work is an essential corollary to the five functions of management. Any control system must be set up in terms of standards. When top management analyzes the efficiency of a department, it checks the quantity and quality of work, the time spent, and the cost. The supervisor is responsible for these factors, and he must control them in order to know how good a job he is doing. By devising objective, measurable standards, he has a basis for comparison.

The ideal standard is as accurate as a micrometer, whether it is measuring hole cut per day per rig or cracking unit's daily output. Such work as building morale and training is more difficult to measure than actual productive work, but if it is broken down into several components, each of which can be measured individually, these can be combined to form a single measure. Several factors are important in devising any standards:

Quantity of work.
Quality of work.
Time spent.
Amount of re-work necessary.
Unnecessary motions.

Once standards are set, they must be **used** to be valuable. They become the basis for evaluation of work that the supervisor can use to keep a check on his workers and on himself, and as a training device. If a worker knows what he should be producing, he is more apt to produce it. If a supervisor knows exactly where his workers are failing, he knows where training is needed.



IN THE LATEST SCURRY COUNTY PLANT

modern Cooper-Bessemers team up for a 3-way job in gasoline extraction

THE Fuller plant in Scurry County, Texas, operated by The Texas Company for the account of the Cogdell Field operator-owners, is one of the newest combination gasoline and pressure maintenance plants to go on stream. Designed and constructed by the O. L. Olsen Company, it has been winning high respect for its latest methods, modern facilities and efficient operation.

Here, as in so many other newsworthy plants, you'll find Cooper-Bessemer units at the heart of the operation. GMV compressors handling process and injection gas — JS gas engines driving 500 K.W. generators.

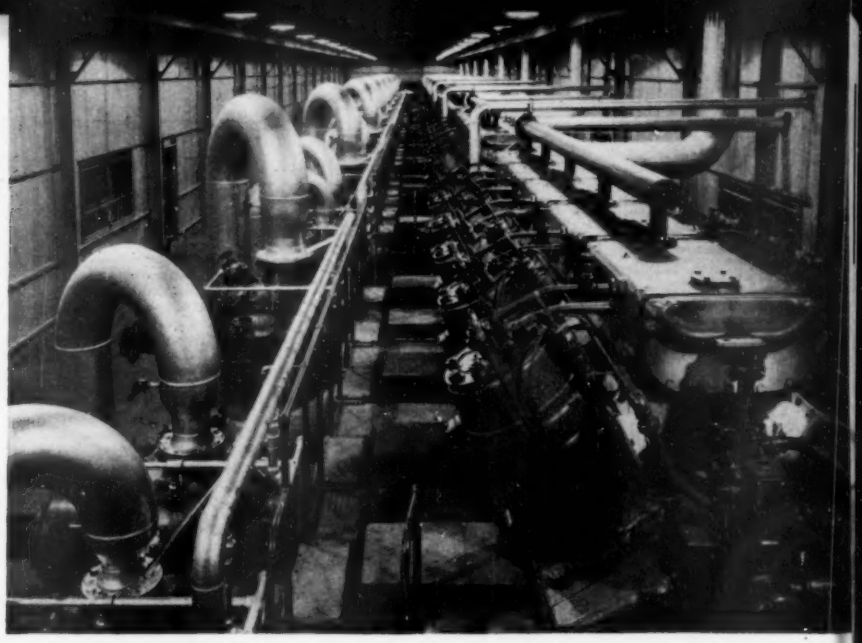
Check up. You'll find that *your* power needs, too, can best be met with modern *Cooper-Bessemers.*

COMPRESSORS-GAS ENGINES-DIESELS

New York Washington, D. C. Bradford, Pa. Parkersburg, W. Va.
San Francisco, Cal. Houston, Dallas, Greggton, Pampa and Odessa, Texas Seattle, Wash.

GMV's

for processing and injection



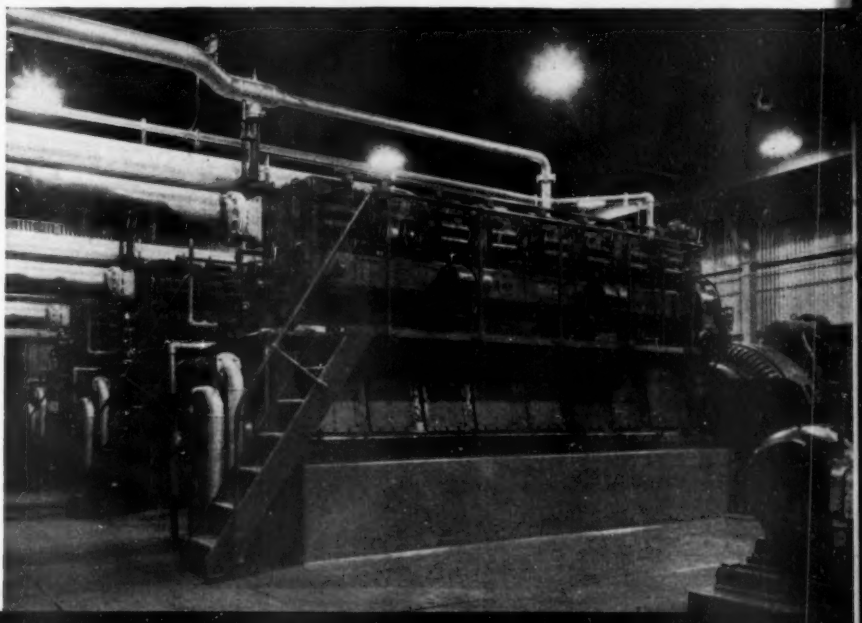
Another Example of Efficient Power at Lower Cost

•*This compressor line-up in the Fuller plant now consists of 880 hp GMV-8-TF units and 1100 hp GMV-10-TF units. Each unit is equipped with a high pressure cylinder for injection service.*

•*These Cooper-Bessemer turboflow, spark-ignited four cycle gas engines drive 500 K.W. generators to provide electric power for the operation of all pumps, air compressors and similar equipment.*

JS's

for electric generation



by **Cooper-Bessemer**

MOUNT VERNON, OHIO AND GROVE CITY, PENNA.

Tulsa Shreveport St. Louis Los Angeles Chicago Caracas, Venezuela

Standards are valuable but they must be established with care and used correctly. Several dangers must be avoided.

1. Standards must be impartial and should not depend on the personal feelings of the supervisor.

2. Standards must be applied to the supervisor's own job, as well as to the jobs he supervises.

3. Samples, not every piece of work, should be checked according to standards.

4. Observation and inspection must be impersonal.

5. The idea of standards must be so "sold" that it is accepted by the group.

6. Standards for departments are interdependent—a particular standard must be determined in relation to those set for work in related departments.

7. Standards are dependent on the proper execution of the basic functions of management. If a foreman is not supervising adequately, it will do little good to evaluate the work of his unit, except to point out his failure.

Set your standards, then **use** them to know where you are going and how well you are getting there. Be a thinking leader.

To Summarize

THE supervisor is the foundation in the petroleum industry—the link between top management and the worker. He builds the organization, and if it is to stand, he must build it according to the laws of management. He must constantly strive to enforce the principles of unity of command, span of control, homogeneous assignment, and delegation of responsibility and authority; he must plan work and time, he must direct, coordinate, and control according to the standards he has established.

In addition, a supervisor is responsible for training within his department. He owes each subordinate the opportunity for self-improvement; and he owes as much to himself. It is a supervisory responsibility to find out what training is needed to reach top production, then to supply that training.

Supervisory responsibility is wide and diversified; it covers every job in a department, and all of the problems, human and mechanical, which pertain to the well-being and the production of that department. Factors such as efficiency of work, cost, and individual differences affect the supervisor even though they are not the direct responsibility of the employes. **If faulty practices exist or if errors persist, the supervisor is to blame.**

Appendix

TRAINING AIDS YOU CAN USE

Listed below are the principal types of training aids which will help immeasurably to "put across" the point, method, or information which you want to teach. Training aids serve but one useful purpose—to make learning easier, more rapid, and more comprehensive. The instructor should select the aid (or aids) best suited to supplement his instruction, in terms of the size of the group, the subject matter, and economy.

1. Outlines, summaries, and manuals . . . Briefs or digests of the material covered. Most useful if (1) illustrated, (2) distributed in advance of training, (3) used for larger groups, (4) instruction is to be recurrent. An economical, easily prepared aid.

2. Blackboard or "chalk talk" . . . Useful when teaching a group or an individual; when diagrams or dimensions are discussed; to summarize points discussed; to illustrate points. Avoid messy blackboard presentations and don't write too much detail on blackboard. Very economical.

3. Chart presentation . . . More expensive than either of the foregoing, less expensive than most other techniques. Best suited to group instruction. Instruction can be "charted" and illustrated in advance, and charts "flipped" over after discussion is complete. Centers attention, summarizes, and holds group interest. Easily portable, and no equipment or arrangements are required. As a variation a blank pad of large sheets of paper can be set on an easel and used as a blackboard. As each page is filled, it is torn off and fastened to the wall. When instruction is complete these pages furnish a summary of instruction.

4. Models and photographs . . . Useful when description of relationships, appearance, or samples is important. Models and "mockups" show learner exactly what the mechanism is and how it operates. Photographs, particularly enlargements, are extremely valuable in showing details, overviews, and sequences because they are very economical, easily procured, and require no special demonstration equipment. While not literally true, the claim, a picture is worth 10,000 words, has merit and should be taken seriously by every instructor.

5. Demonstrations . . . In this type of presentation the task or operation to be learned is demonstrated before the class or the individual by the instructor or members of the group. It usually requires a duplication of the elements and equipment of the actual work area. It is applicable to shop, office, and operating jobs. It can be used with great success to "act out" a selling situation, a supervisor-employer problem, etc. It is most useful in illustrating the "how" part of the job. Effective because it encourages active participation of the learner.

6. Opaque projector and Visual-Cast . . . This type of projector throws an image of an object, a page, a chart, or other training material on the screen in enlarged form. Projection is directly from original piece—no film or slide required. Very effective for pieces up to 8 by 10 in. Disadvantage—room must be darkened and projector is expensive unless rented.

The "Visual-Cast" (Vu-graph, etc.) is similar in function to the opaque projector but has the advantage of operating in a semidarkened room. Gelatin transparencies of material to be presented must be made up specially. Limit of transparency size is 6 by 8 in. Relative expensive to buy but very useful for a continuing training program.

7. Slides and silent film strips . . . Similar to photographs in application but have the advantage of large size projection on screen, allowing full enlargement of details. Can be colored or black and white. Require positive prints on film. Film and preparation—inexpensive. Projection equipment—relatively inexpensive. Requires darkened room. Very wide usefulness.

8. Sound-slide films . . . A strip of pictures (colored or black and white) printed positively on a strip of 35 mm. film in sequence. A recording of the background voice and commentary carries the "story" and makes each point. Record is synchronized with pictures on film to tell an "active" story. Film and preparation—inexpensive. Projection equipment—relatively expensive. Room must be darkened. Has advantage that instructor can stop the showing at any point and elaborate on points made in film.

9. Motion pictures (silent or sound) . . . Useful where action, movement, personal relations, cause and effect, and interrelationships are to be emphasized. Most expensive of all training aids, both in equipment and materials. There is now available a large stock of excellent films on business, industrial, and personnel practice which can be borrowed, rented, or purchased. Very effective learning device.

If you have enjoyed or found a reading of this article rewarding, and would like a reprint for your personal file, write and tell us. Single copies are sent with our compliments; quantity lots quoted on request.

TABLE 1—GROWTH OF UNDERGROUND NATURAL-GAS STORAGE IN THE UNITED STATES

Year	No. pools	No. states	Combined ultimate capacity (billion cu. ft.)
*1944	50	11	135
†1947	70	11	250
‡1949	80	11	497
1950	125	15	774
1951	142	15	916

*Dahlgren, E. G., A.P.I. Eastern District meeting, Columbus. †Dahlgren, E. G., A.G.A. Natural Gas Department meeting, Chicago. ‡Ball, Max W., A.G.A. Natural Gas Department meeting, French Lick, Ind.

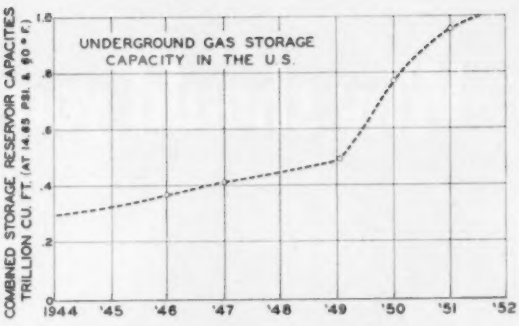


Fig. 1—Trillion-cubic-foot mark was reached last year.

Underground Gas-Storage Capacities in U. S. Now Nearly a Trillion Cubic Feet

by Joseph A. Kornfeld
Mid-Continent District Editor

THE trillion-cubic-foot mark in the combined capacities of underground natural-gas reservoirs of the United States was reached during 1952, according to data recently released by the American Gas Association. (See Fig. 1.)

This phenomenal growth in the past few years in underground-storage projects is reflected in the fact that total storage capacity in existence today has nearly doubled over that in operation at the end of 1949.

John V. Goodman, Equitable Gas Co., Pittsburgh, chairman of the subcommittee on statistics of the A.G.A. Committee on Underground Storage, states in the subcommittee's first annual report that the combined estimated ultimate capacity of these reservoirs was 916 billion cubic feet at the beginning of 1952. This is a gain of 142 billion cubic feet over January 1, 1951.

The committee estimated that the total capital expenditures for underground storage purposes was approximately 170 million dollars as of the beginning of 1952; physical properties and cushion or base gas in storage are included in this figure.

Standard base . . . In conformity with the practice of other A.G.A. committees, both the subcommittee and the

Storage Gas Defined

The committee has accepted the definition of the A.G.A. Committee on Natural Gas Reserves that "storaged gas" is "that gas which has been transferred from its original location in a gas and/or oil field to another natural underground reservoir for the primary purpose of conservation, fuller utilization of pipe-line capacities, and more effective delivery to markets."

TABLE 2—ANALYSIS OF UNDERGROUND NATURAL-GAS STORAGE RESERVOIRS IN THE UNITED STATES BY STATES FOR YEAR ENDING DECEMBER 31, 1951
(M.c.f.—14.65 psi. at 60° F.)

State—	No. pools	No. active wells	No. comp. sta.	Total hp. comp. sta.	Maximum gas in storage*	Gas in storage† 12-31	Year ended 10-31 Input to storage	Year ended 10-31 Output from storage	Year ended 10-31 Max. day output	Ultimate reservoir capacity
Arkansas	2	16	1	75	2,021,615	1,996,000	816,783	644,195	6,367	5,290,000
California	4	31	3	11,544	17,723,030	14,842,000	12,965,086	14,431,987	274,629	18,214,633
Indiana	2	54	2	1,370	1,232,426	1,047,000	660,359	524,888	5,193	7,059,837
Kansas	12	331	6	8,390	34,802,073	31,627,000	16,000,817	14,640,289	213,463	62,944,876
Kentucky	4	199	3	7,140	14,889,470	11,185,000	5,537,046	5,749,951	84,718	20,590,586
Michigan	6	591	2	36,180	52,149,733	42,648,000	48,187,208	37,189,178	546,178	67,037,615
Montana	3	54	2	2,650	7,711,542	7,563,000	3,628,873	304,600	13,344	21,537,600
New Mexico	3	43	2	2,400	16,753,447	15,252,000	2,557,533	4,829,736	54,628	92,098,880
New York	14	252	10	4,700	19,107,170	15,623,000	10,559,041	4,026,012	83,686	28,807,163
Ohio	10	1,268	10	27,592	114,930,103	104,510,000	64,168,922	38,881,119	560,121	160,806,085
Oklahoma	5	41	2	4,800	38,267,299	34,739,000	21,187,575	6,545,679	131,870	88,310,000
Pennsylvania	51	1,143	33	66,074	119,028,170	100,864,000	72,796,566	33,781,030	644,822	178,644,029
Texas	2	7	2	1,200	1,914,099	1,820,000	1,333,404	102,298	6,882	4,800,000
West Virginia	22	345	16	35,580	104,547,455	89,983,000	76,166,952	37,439,907	591,444	137,796,816
Wyoming	2	9	2	1,785	1,642,643	692,000	1,178,680	1,343,834	23,281	22,050,400
Totals	142	4,384	96	211,480	546,720,275	474,441,000	337,744,845	200,434,703	3,240,626	915,988,520

*Of 32 companies reporting, 25 showed October 31 as the approximate date of maximum gas in storage. †Data from Annual Report of A.G.A. Committee on Natural Gas Reserves (total includes 40 million cubic feet from Mississippi).

Why should you consider using

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Why indeed. Aren't all wire ropes alike? They look alike. Why should you choose HERCULES Red-Strand rather than any other?

The answer would be easy if you could discover by *feel* why HERCULES Red-Strand performs so well. Or if you could see, or hear, or taste the *special quality* that makes users praise it so highly. But you can't. Wire rope isn't like that.

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Usually you become aware of the consistently high performance of HERCULES Red-Strand by hearing users praise it . . . or by using it yourself and checking results.

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What is this something special?

It is partly the result of generations of specialization. Leschen is concerned *entirely* with making wire rope. Nothing else. No other processes or activities interfere.

It is partly Leschen's 97 years' experience and Leschen's natural ability to make good wire rope . . . which has resulted in several major "firsts" in the development and most efficient use of wire rope.

It is partly pride of craftsmanship . . . from policy to engineering to finished rope. It is the effort always to make HERCULES Red-Strand *better than we claim it to be.*

In a word, it is *quality* . . . higher-than-rated quality. This is the *something special* in HERCULES Red-Strand wire rope that means *longer-than-expected* service . . . year in, year out.

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TABLE 3—SUMMARY OF PERTINENT DATA CONTAINED IN REPORT

	1950	1951	Change
Number of states	15	15	0
Number of companies	31	32	+1
Number of pools	125	142	+17
Number of active wells	3,853	4,384	+531
Number of compressor stations	83	96	+13
Total horsepower of compressor stations	158,173	211,480	+53,307
Maximum gas in storage, M.c.f.	412,106,099	546,720,275	+134,614,176
Gas in storage as of December 31, M.c.f.	341,690,000	474,441,000	+132,751,000
Input to storage for year ending October 31, M.c.f.	236,682,760	337,744,845	+101,062,085
Output from storage for year ending Oct. 31, M.c.f.	143,435,301	200,434,703	+56,999,302
Max. day output for year ending Oct. 31, M.c.f.	2,591,449	3,240,626	+649,177
Ultimate reservoir capacity, M.c.f.	774,433,966	915,988,520	+141,554,554
Number of new pools under construction	10	8	.....

TABLE 4—TOTAL NUMBER OF COMPRESSOR STATIONS AVAILABLE FOR UNDERGROUND STORAGE OPERATIONS

	1950	1951	Change
Input only	20	21	+ 1
Both input and output	52	63	+11
Output only	11	12	+ 1
Total	83	96	+13

committee on underground storage have used in their report a pressure and temperature base of 14.65 psi. and 60° F. for all gas volumes.

The subcommittee estimated that gas in storage at the beginning of 1952 totaled more than 474 billion cubic feet which marks a gain of 134 billion cubic feet over conditions existing at the beginning of 1951. Output from storage for the year ended October 31, 1951, was in excess of 200 billion cubic feet, a gain of 56 billion cubic feet over conditions as of October 31, 1950. Maximum day output for the period was over 3.2 billion cubic feet as compared to 2.6 billion the previous year.

Total installed horsepower in compressor stations rose to 211,480 hp. in 95 stations at the beginning of 1952 which marks a gain of 53,307 hp. over conditions existent on January 1, 1951, when there was 158,173 hp. in operation in 83 stations.

Active wells employed in underground storage rose to a new high, the report states. At the beginning of this year there were 4,384 wells active in 142 pools in 15 states. On January 1, 1951, there were 3,853 wells active in 125 storage pools in 15 states.

More than one-third of all of the nation's underground natural-gas storage reservoirs are located in Pennsylvania. On January 1, 1952, Pennsylvania had 51 storage pools in which there were 1,143 active wells with a combined ultimate reservoir capacity in excess of 178 billion cubic feet. Gas in storage in Pennsylvania reservoirs totaled more than 100 billion cubic feet at that time.

Subcommittee Members

Members of the subcommittee on statistics other than Goodman are: William F. Burke, Lone Star Gas Co., Dallas; Nelson P. Chesnutt, Southern Union Gas Co., Dallas; John B. Corrin, Jr., Hope Natural Gas Co., Clarksburg, W. Va.; H. L. Fruechtenicht, Jr., Michigan Gas Storage Co., Jackson, Mich.; Sivert A. Haavik, Pacific Gas & Electric Co., San Francisco; Russel W. Hofsess, Cities Service Gas Co., Oklahoma City; F. A. Hough, Southern Counties Gas Co., of California, Los Angeles; Charles C. Ingram, Oklahoma Natural Gas Co., Tulsa; Lysle R. Kirk, Ohio Fuel Gas Co., Columbus; Edwin L. Rawlins, Union Producing Co., Shreveport; S. E. Runser, Montana Power Co., Butte; D. T. Secor, United Natural Gas Co., Oil City, Pa., and Eugene D. Milener, American Gas Association, New York, secretary.

The subcommittee was chosen from members of the Committee on Underground Storage headed by Fenton H. Finn, New York State Natural Gas Corp., Pittsburgh.

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SUMMARY, RESULTS IN THE FIELD, AND CONCLUSIONS

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In the United Kingdom, where Anglo-Iranian operates the only producing oilfield (at Eakring, in Nottinghamshire), the Company has recently spudded in an exploratory well on the Isle of Wight, using a 136ft. derrick.

ANGLO-IRANIAN OIL COMPANY, LTD., with its subsidiary and associated concerns, is one of the major units of the world petroleum industry.

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The Company operates refineries in Great Britain, France, Belgium, Germany, Italy, Israel and Australia. Distribution and marketing of oil products are effected both by the Company itself and through various associated companies. For sea transport its shipping subsidiary, the British Tanker Company, operates one of the largest fleets of ocean-going tankers. The Company's principal research establishments are in Great Britain, at Sunbury in Middlesex, and at Kirklington in Nottinghamshire.

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Rig Skidded in 15 Minutes

(Continued from page 117)

tractor duplicated the same bore-hole size as that used on the discovery well and set 358 ft. of 13⅜-in. pipe, the same practice as followed in I A. J. Headlee. However, in cutting the intermediate hole, contractor changed from 12¼-in. to 11-in. and instead of setting 9⅝-in. protection pipe will set 8⅝-in. at 5,600 ft. The shoe will be drilled with a 7⅞-in. bit instead of an 8¾-in. bit. In the long hole, as formerly, the oil string will be 5½-in. pipe set in the top of the Ellenburger.

Mud Program

The problem of getting well samples while using clear fresh water when drilling shallow depths was solved by the experimental drilling with reverse circulation under the surface pipe. This procedure was effective until crews encountered cavities at a depth of 6,053 ft. when reverse circulation was suspended.

The following mud properties at various levels are indicative of practices employed:

Depth (ft.)	Weight (lb. gal.)	Viscosity A.P.I. sec.	Wall cake (in.)
6,053	8.7	38	1/32
7,100	9.1	36	2/32
Spraberry:*			
9,300	9.2	45	2/32
11,000	9.3	50	2/32
Devonian:†			
11,500	9.4	110	2/32
12,000	9.5	120	2/32
12,500	9.3	100	2/32
13,000	9.5	110	2/32
Ellenburger:‡			
13,313	9.1	57	2/32

*Top of Spraberry 8,020 ft. †Top of Devonian 11,463 ft. ‡Top of Ellenburger 13,076 ft.

Prolific Drill-Stem Tests

On the fourth and final drill-stem test in the Ellenburger dolomite at corrected total depth of 13,313 ft., with packer set at 12,256 ft., I A. J. Headlee was tested for 4 hours in open-hole section to bottom. It showed gas to surface in 55 minutes at the rate of 41,000 cu. ft. per day. Recovery in drill pipe was 1,530 ft. of oil-cut water blanket and 7,000 ft. of free oil; there was no formation water. Open flowing bottom-hole pressure ranged from 1,045 to 2,325 psig.; shut-in bottom-hole pressure was 5,910 psig. after 30 minutes.

Acknowledgment

Thanks are extended to the management of The Texas Gulf Producing Co. discovery operators and to B. E. Groenewold of Exploration Drilling Company, Tulsa, contractors on the first two wells in this new field.

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WICHITA *Air-Tube* CATHEADS

Two of the most important advantages of Wichita Catheads are: (1) they make up each joint to the same degree of tightness; and (2) they are highly dependable because of the Air-Tube Disc Clutch around which the catheads are designed and built.

Contractors using Wichita Air-Tube Catheads recommend them for SIMPLE, FOOLPROOF AND EFFICIENT OPERATION.

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Standard or special substructures are available to give you practically any arrangement you need. Substructures can be designed so they are adaptable to all draw works giving you unusual versatility for masts of this size.

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Even the 100′ Mast with 15′ width at the bottom, will accomodate any draw works that will drill to 8000′, and leave plenty of working space on the mast floor.

PORTABILITY

The 100′ mast can be transported on 3 to 4 trucks. A maximum of 5 trucks will carry the 131′ mast. Both masts can be skidded in the field without lowering.

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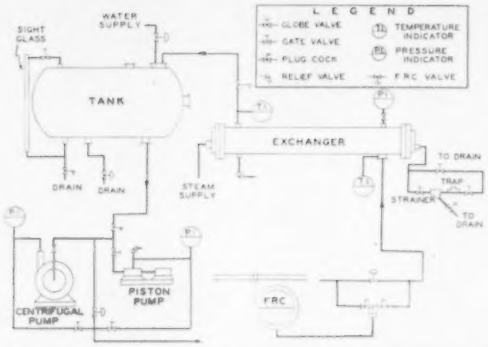
MONSANTO PRACTICE UNIT, pictured at left above, is used to train new personnel in the various phases of process operation. A flow sheet of the unit, showing accepted equipment representations and piping legend, is at right.



"Practice" Unit Aids Operator Training Program...

...ASSURES EFFICIENT OPERATION at this big Texas City petrochem plant of the Monsanto Chemical Co., in spite of the fact that 165 new operators are on the job.

. . . at Monsanto Chemical Plant

by F. Lawrence Resen
Gulf Coast District Editor

A LIMITED and inexperienced labor supply and a major expansion program both point toward the same end, namely an operator's training program.

And this was the end reached at Monsanto Chemical Co.'s Texas City plant where the problem had passed the academic stage and faced management in all its practical aspects.

Monsanto had embarked on a long-range construction program which required the addition of 165 operators to its regular personnel to handle the new units which were to be placed on stream. The situation was complicated since in the highly industrialized Gulf Coast area surrounding Texas City, experienced help is both in high demand and in short supply.

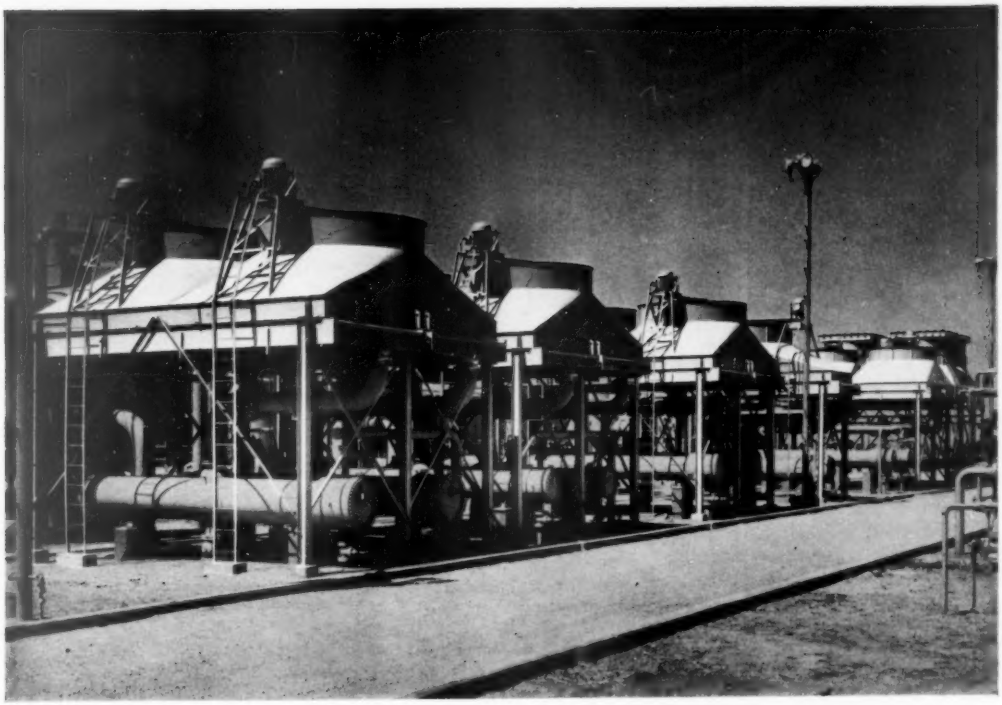
While some of the applicants for the new positions had industrial experience, others were complete novices to industry, and very few of those with experience had worked around processing units.

The result . . . As a direct outgrowth of the dilemma came a formalized operating fundamentals training program, designed to give each new individual basic information pertinent to process operation and Monsanto's methods and to initiate the schooling as soon as the individual began his employment.

A 3-week indoctrination course was set up which, in addition to briefing the prospective operators on such standard items as employe benefits and plant rules, included classes on 25 operating fundamental subjects such as valves, heat exchangers, and instruments. The course was set up to stress visual aids as well as the use of actual pieces of equipment in class discussions.

A laboratory was established which contained flow lines and equipment to simulate a variety of conditions which the operators would encounter in the actual units. The lab setup was designed by the production department and included a heat exchanger, flow recorder, measuring tank with sight glass, steam pump, and electric-motor-driven pump plus different types of valves and a complex piping arrangement. The trainees used the equipment to set up various flow arrangements so as to become familiar with the basic equipment in evidence and about which they had been studying. Practical problems were solved by the classes which required the adjustment of recording instruments, the handling of flow charts, and the recording of data—all of which would be duties encountered in regular operations on the plant units.

The laboratory unit is also used in conjunction with the course covering the reading and use of flow diagrams. Blown-up flow diagrams of small units are used in describing how the sheets are read and applied in plant operations



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Bulletins on HUDSON TOP PERFORMANCE cooling equipment mailed upon request.

At the Diamond M-Sharon Ridge gas processing plant in Scurry County, West Texas, most of the heat from gas compressed in three stages is dissipated directly to the air in the SOLO-AIRE units shown above. Other SOLO-AIRE units are employed in this plant for oil cooling, acid gas condensing, still overhead condensing, propane and butane condensing, and jacket water cooling. In this and many other plants in water-scarce West Texas, Hudson SOLO-AIRE units have established their reputation for dependable, trouble-free operation.

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Beauty and utility have been successfully combined in the HUDSON "TP" design. These Top Performance cooling towers embodying new but proven advancements in water cooling design, result in lower installation and operating costs for a given guaranteed performance.

SOLO-AIRE EXCHANGERS

HUDSON Solo-aire exchangers for jacket water cooling, gas cooling, steam condensing and hydrocarbon vapor condensing have found wide use, particularly where suitable cooling water is impossible or expensive to obtain. Even where adequate quality and quantity of water is available there are conditions under which these units have marked advantages over alternative cooling methods. Designs are available for pressures up to 5,000 pounds per square inch.

COMBIN-AIRE UNITS

By combining in one structure Solo-aire units with a cooling tower, HUDSON originated the Combin-aire unit. In hot weather, air before use in the Solo-aire units, is contacted with water to reduce both air and water temperature. In cold weather, water use is unnecessary. This device makes possible the use of air for low temperature cooling, allows use of untreated water, minimizes water consumption, and results in capital and operating savings.

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The latest in a long list of Hudson innovations. The auto-variable pitch fan controls cooler outlet temperature through automatic change in fan blade pitch, which in turn changes air volume across cooler tubes. Outlet temperature is closely controlled, and in a typical case horsepower consumption over the year is reduced seventy percent as compared with fixed pitch fan operation.

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These units are for use where water serves as cooling medium. They may be mounted vertically or horizontally, under cooling tower or submerged in water.

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and then a detailed flow diagram of the laboratory equipment is used in conjunction with the equipment to supplement the lectures, with the supplement in this case providing a fuller understanding of the subject.

In stressing visual aids, large-size sectionalized diagrams of such items as valves and pressure regulators were prepared by the instructors or obtained from manufacturers and used for instruction purposes. Where possible, actual items—either new or used—are broken down in the lab to show the construction and engineering details.

"Shop talk" . . . An interesting course presented to the new men is that in

OPERATOR TRAINING PROGRAM

In Monsanto's Operating Fundamentals program, the individual courses are set up to cover one or more hours, depending upon the emphasis desired. In each course the instructor adheres to an outline to insure that all points will be covered. In most of the courses, visual aids are used including actual pieces of equipment, blown-up diagrams, on-the-job inspection of related equipment, etc. In the following paragraphs will be seen a typical outline followed. In this instance, OF 11, Steam Traps, is the course under discussion.

Topics—	Estimated time
1. Introduction of instructor and subject	2 min.
2. Purpose of steam traps	3 min.
3. Are steam traps necessary	5 min.
4. Types of steam traps	30 min.
a. Bucket types	
(1) Inverted	
(2) Open	
b. Float type	
c. Thermostatic type	
d. Impulse type	
5. General information	10 min.
a. Location	
b. Installation	
c. Operation	

References:

1. "Solving Steam-Trap Problems," by V. D. Anderson Co.
2. Clark Fluid Controls Catalog T 1451, by Clark Manufacturing Co.
3. Steam Plant Equipment Bulletin T-1739 (1946), by Yarnell Waring Co.
4. The Armstrong Steam Trap Book, by Armstrong Steam Trap Co.

Instructural aids:

1. Dismantled Anderson float trap
2. Dismantled inverted bucket trap
3. Dismantled open bucket trap
4. Dismantled thermostatic trap
5. Dismantled impulse trap
6. Film on steam traps
7. Illustration

Discussion Outline

I. Introduction of leader and subject:
  1. Name and duties of leader.
  2. The purpose of this meeting is to learn something about steam traps—their purpose, construction, and operation.

II. Purpose of steam traps:
  1. Steam is a vapor or gas formed when water is sufficiently heated. When heat is taken away from steam it will again turn to water, commonly known as "condensate."
  2. The purpose of a steam trap is to automatically drain condensate and relieve air from a system without permitting steam to escape.
  3. A system can be:
    a. A plain steam line
    b. A reboiler
    c. Steam tracing
    d. (or it can be a number of each of these).

III. Are steam traps necessary:
  1. Why remove condensate? Any condensate in the system will curtail heat transfer, as hot water has less available heat than steam.
  2. Why is there air in a system?
    a. Steam usually contains a small amount of air.
    b. During shutdown periods, air will fill a system.
  3. Why remove air?
    a. Air reduces the volume of steam and also insulates the heating surface thus reducing transfer.
    b. Air accelerates corrosion.
  4. Traps prevent the accumulation of excessive amounts of condensate which if suddenly liberated would cause a "water hammer" which is harmful to piping and equipment.
  5. Traps prevent the escape of steam which is expensive to manufacture. An example would be: If it costs 50 cents to manufacture 1,000 lb. of steam, a steam leak through an opening only ¼ in. would cost $1,260 per year.
  6. Traps prevent the buildup of excessive back pressure in condensate return lines.

IV. Types of steam traps:
  A. Bucket types
    1. Inverted bucket traps
      a. These traps are best suited for steam lines where abnormal amounts of air must be discharged. Such a type service would be:
        1. Steam headers to engines, turbines, or pumps.
        2. Steam lines
        3. Tracer lines.
      b. Operation of trap. Venting of gases (steam and air) through vent at top of bucket allows condensate to rise in the bucket. With most of the gas vented, the bucket loses buoyancy and starts downward. Downward movement of bucket, through leverage, opens the discharge valve, allowing accumulated gases and condensate to be discharged. When sufficient gases accumulate in bucket to restore its buoyancy, the bucket will again rise and close the discharge valve.

(Similar discussions are used for the other types of traps, such as open-bucket, float, thermostatic, and impulse type).

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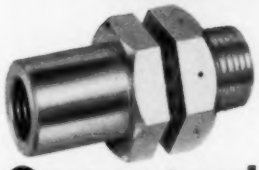

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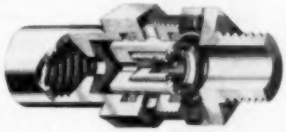

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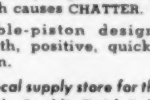

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"Terminology and Color Code." As was noted, the average new employe was unacquainted with industry and the large majority of those with experience obtained it out of the chemical-processing field. Words and phrases common to the experienced operator such as "bubble tower," "blowdown," and "reflux" represent a hopeless jargon to the novice. To help the newcomers over the language hurdle, the course included most of the common expressions relative to plant operations. In the terminology listings, a slight bit of literary license was used, however, so that the terms were made to apply to specific operations at Texas City. Instead of getting the trainee mired down in a formal definition involving organic chemistry, "alkylation," for instance, became "a process for combining benzene with ethylene"; likewise, "cracking" simply became "splitting of propane by heat."

The schedule is also interspersed with courses on organization and products, safety rules, plant rules, and company policies, to acquaint the men with the company and the plant. However, most of this orientation part of the course is covered in the first couple of days, with the exception of fire fighting and first aid which receive intensive coverage throughout the entire course.

The instruction was planned and scheduled so that each group of new operators completed the 3-week Indoctrination Course in Operating Fundamentals approximately 3 months before the startup of the units to which they were assigned. The 3-week course in operating fundamentals did not, by any means, qualify them as full-fledged operators, but did serve as a prelude to their actual jobs of operating a full-size unit.

Upon being assigned to their operating units, the new operators are given on-the-job instruction by the supervisors and chief operators. During the construction and expansion program they served as inspectors and witnesses of hydrostatic tests of piping and pressure vessels. On-the-job instruction and training is carried on continuously within the units, with periodic examinations (written and oral) being given at frequent intervals to test the progress of each man and to indicate where special training is required.

The courses were begun in March 1951, when the first class of trainees began the 3-week training period. This class was followed up by several others at roughly 90-day intervals so that in the ensuing months, a total of 165 new operators have received the formalized training. In addition, 16 supervisory personnel were given the identical training preparatory to their taking over

some of the teaching which had originally been handled by top supervisors whose time was required more and more in the construction program.

The results . . . In any type of training program, it is difficult to obtain an exact evaluation of the results. One of the most important features of the program is the uniformity of operator knowledge. Instead of the new operators merely "wandering around" the units, and picking up information piecemeal, management has been assured that each man has the same comprehensive, minimum base from which to begin. By giving each individual the same basic information regardless of background, it means that each will be equally acquainted with the operating fundamentals as presented in the course.

The operating fundamentals course was set up for the specific benefit of newly employed operators. It was assumed that they would be so lacking in technical knowledge, terminology, and Monsanto operating procedures that it would be beneficial to give them this instruction before they were assigned to actual operating duties.

The best proof of the efficiency, effectiveness, and need for this type of training is best illustrated by the fact that shortly after the first of the new operators completed this 3-week course and reported to the new units, the experienced operators already on the job requested that they also be given similar training. The chief operators candidly admitted that, because of their specialization, the new men who reported on the job had a wider basic knowledge of the equipment.

As a result, a 1-week, 40-hour course was set up for the benefit of the older and more experienced operators. This required a delay in the schedule of training of new operators, but it was felt that the time was well spent, as it resulted in having the older experienced operator group brought up to date on both the old and the new equipment.

Trainee reaction . . . Other comments on the course were obtained from trainees themselves, who were encouraged to comment anonymously on the courses both negatively and positively. The response was exceptionally gratifying to the management with the men not only exhibiting an interest in the courses and their work but also expressing gratitude at being given the instruction.

Monsanto's problem is not unique to industry. Expansion is proceeding at record rates throughout processing industries and the need for experienced and trained personnel is felt almost universally. A program such as Monsanto's presents increasing possibilities to management. Where its program already has paid off twofold in the training of new operators and improved training of older operators, its potentialities may not be fully realized until long-range effects may be evaluated.

Applied Training

Practice equipment . . . A strong feature of the entire operating fundamentals course is the unit setup in the school building which provides each trainee with the opportunity to handle and operate various pieces of basic equipment.

The unit includes a pressure vessel, measuring level gages, controller recorder, a conventional meter run, air compressor, and a heat exchanger. The driving units for this setup consist of electric, centrifugal, and steam displacement pumps.

To familiarize the trainees with the flow layout, the process was studied with the use of a flow diagram, with the instructor tracing through the flow on the chart and on the actual unit. As a means of giving the trainees a chance to become better acquainted with flow charts, a partial flow chart, including the basic equipment, such as tank, exchanger pumps, and flow recorder-controller was given to each man. He then traced the flow on the actual unit and made the necessary additions to the incomplete flow chart, such as inlet

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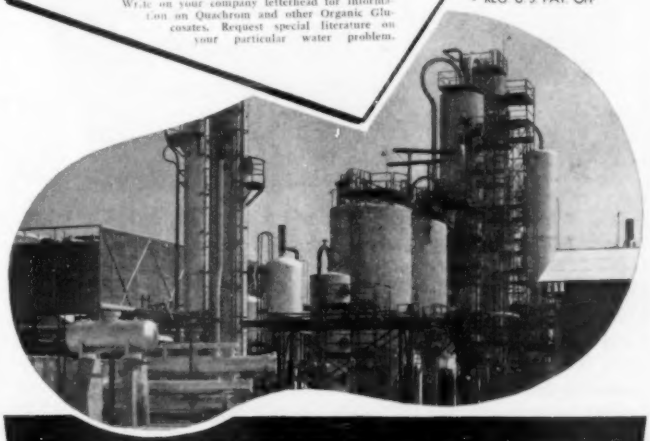

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and outlet lines, valves, drain lines, and instruments.

Particular items . . . The individual items were analyzed as to uses, along with auxiliary equipment, after which the trainees would operate the process, rotating so that each man became familiar with the entire unit.

Discussion and operation of the tank, for instance, involved bringing forth its use at atmospheric pressure as a surge tank to supply the pumps. In addition, the trainees determined liquid level by use of a reflex-type gage glass. The operation of the tank was then followed through by their adjusting inlet and outlet valves to control flow.

The component parts of the centrifugal pump on the unit were noted and the proper operation of the pump was demonstrated and then practiced by the trainees. This entailed the checking of oil supply and adding makeup oil, adjusting packing gland and checking for leaks, tracing through inlet and outlet lines, and the proper method of starting and stopping the pumps.

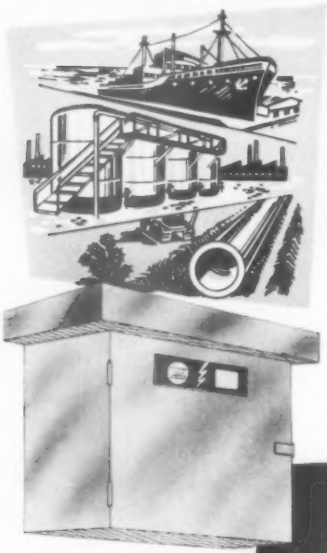
A similar plan was followed in the study of the steam pump. In addition to different type packing glands and the use of a lubricator in its operation, the steam pump provided experience in draining condensate from the steam chest. The use of pressure gages and the relation of pressure to the pump speed were evidenced as was the use and operation of a relief valve.

Instruments came in for scrutiny in the lab unit, as a flow recorder-controller was placed in operation and various changes made in the process flow to study the effect on the recording chart. The use of orifice flanges and taps on a meter run were also studied and their use in the flow system explained.

The heat exchanger on the unit was used to show countercurrent flow and differences in inlet and outlet temperatures shown to illustrate use of the exchanger. A steam trap, strainer, and use of bypass valve in heating exchanger faster in starting up were also demonstrated in this session.

Subjects covered in the operating fundamentals course are as follows:

1. Therminology and Color Code . . . Discussion of operating terms, lingo, and plant color code system.
2. Fundamentals of Chemistry and Physics . . . Discussion of basic facts about general chemistry and physics of materials encountered in the plant. (Example: organics, stainless steels, hydraulics, etc.).
3. Valves . . . Discussion of gate, globe, needle, check, and excess flow valves, and plug cocks.
4. Pumps . . . Discussion of types, uses, and construction of centrifugal, reciprocating and gear pumps.
5. Drivers . . . Discussion of electric motors, including switches and circuit breakers, steam turbines, steam engines, and gas engines.
6. Heat Exchangers and Condensers . . . Discussion of uses, types, construction, and corrosion of heat-exchange equipment.
7. Tanks . . . Discussion of types, use, constructions, and gaging of tanks.
8. Columns and Towers . . . Discussion of principles of fractional distillation, types and construction of distillation equipment.
9. Compressors . . . Discussion of principles, types, uses, and construction of compressors.
10. Furnaces . . . Discussion of types, uses, and construction of furnaces.
11. Steam traps . . . Discussion of operation, use, and construction of steam traps.
12. Jets . . . Discussion of types, uses, and construction of jets.
13. Safety Devices . . . Discussion of relief valves, rupture disks, tank vents, and snuffing systems.
14. Driers . . . Discussion of uses, construction, and reason for driers.
15. Instruments . . . Discussion of principle of measurement of flow, pressure and temperature.
16. Sampling . . . Discussion of method, and reason for sampling.
17. Utilities . . . Discussion of plant utility systems and their uses.
18. Log Sheets . . . Discussion of reason and method of keeping log sheets.
19. Cooling Towers.
20. Tank Cars, Barges, and Pipe Line.
21. Safety Equipment and Gas Mask Drill.
22. Preparation of Equipment for Maintenance and Fire Permit System.
23. Reading and Using Flow Diagrams.
24. Introduction to Assigned Unit.
25. Unit Operations Practice Session.



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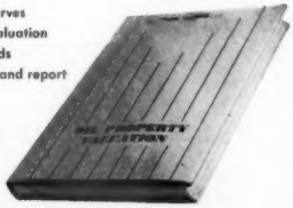

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Sulfur-Recovery Plant At Keystone

(Continued from page 119)

and other utilities are obtained from the existing gasoline extraction plant, and operating labor is available on a part-time basis, utilizing existing personnel.

Instrumentation for the plant consists of two ratio flow controllers properly to apportion the correct air and gas ratios to the process equipment, along with flow, level, and temperature controllers. The instrumentation is such that the plant "floats" on the line, and the set point on the instruments will take into account any ordinary change in flow conditions; however, changes in atmospheric air temperature and acid-gas composition necessitate resetting the controls.

The sulfur-recovery unit proper is of a package-type construction, and the major portion of the equipment is mounted on structural-steel framework. The unit proper occupies a space approximately 30 by 30 ft. exclusive of steam-condensing facilities and sulfur storage.

Laboratory control tests consist of conducting an Orsat gas analysis on the flue gas from the heat-recovery boiler, and also on the vent gas from the sulfur condenser. The oxygen content of the flue gas from the heat-recovery boiler is maintained at a minimum level, and is rechecked by maintaining a minimum oxygen content in the vent gas, which usually ranges in the neighborhood of 0.5 to 0.75 mol per cent. The efficiency of conversion is determined by the quantity of unconverted hydrogen sulfide and sulfur dioxide present in the vent gas. Oxygen is absorbed in alkaline pyrogallol solution, while the total hydrogen sulfide and sulfur dioxide content is determined by absorption in a sulfuric acid-chromic oxide solution.

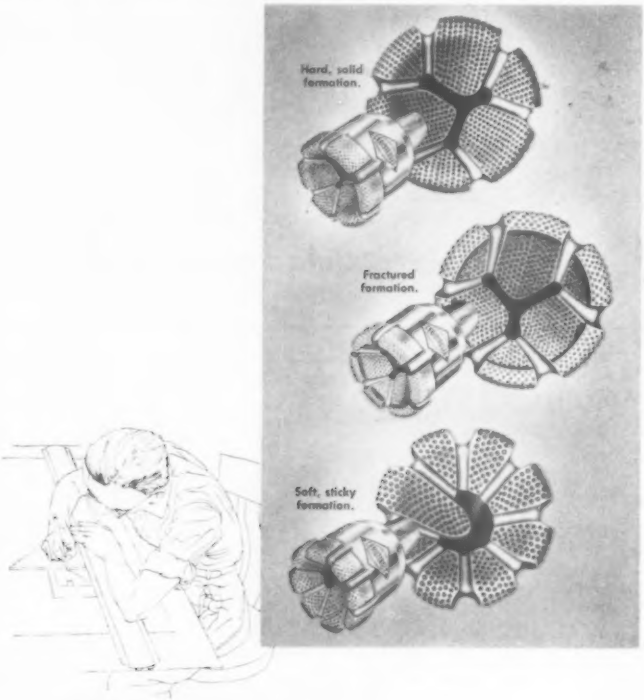
Sulfur handling . . . The sulfur produced possesses a light yellow color, and has a very slight organic sulfur odor, as differentiated from naturally occurring Frasch-mined sulfur, which is practically odorless. The sulfur from this plant is shipped to market points in a liquid state by means of tank-truck delivery; however, provision has been made for emergency block storage of sulfur on a concrete slab adjacent to the plant.

As an alternate to shipment in the liquid state, some liquid sulfur is transported to the Sid Richardson Odessa sulfur-recovery plant, where sulfur-flaking facilities are available. At the Odessa plant, the sulfur is solidified into flat particles, approximately ⅛ by ¾ by 1/32-in. thick, which are readily handled by mechanical loading equipment.

The conversion of the liquid sulfur to the flake form at Odessa is carried out by means of a water-cooled flaking drum. This flaking drum consists of a cast-iron cylinder, in which the bottom portion is submerged in a steam-jacketed sulfur feed pan, and the internal portion of the drum is cooled by a water spray. As the drum rotates, a film of sulfur adheres to the outside of the drum and solidifies. This solid film of sulfur is continually scraped from the drum by means of a stationary blade, and the flake sulfur thus produced passes to a mechanical conveyer system and is transported to an elevated storage bin for subsequent gravity loading into hopper trucks. This method of solidification of liquid sulfur embodies a minimum amount of manual handling, and some of the new plants under construction are planning to use this system.

The sulfur produced at this plant is largely used in the preparation of insecticides for crop dusting, and the production of flake sulfur greatly facilitates the handling of this product.

Construction of this project was carried out by Sid Richardson Gasoline Co.'s own construction forces, and the plant was engineered by Graff Engineering Co. of Dallas.



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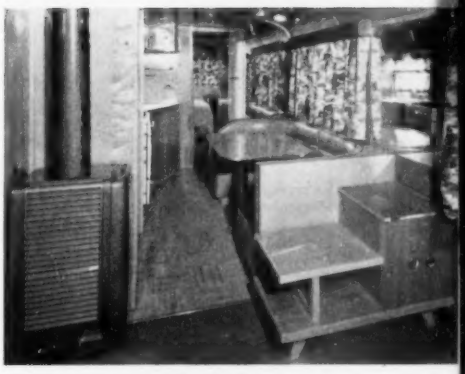

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Annual Diesel-Fuel Survey—1952

by O. C. Blade*

Largest consumers of diesel fuels are the railroads, followed by trucks, buses, tractors, bulldozers, water craft, and other moving equipment. The survey here abridged covered 285 samples of diesel fuel manufactured in 106 refineries in the United States.

TABLE 1—SUMMARY OF GRADE 1-D FUELS

Geographic distribution (region)	Eastern	Southern	Central	Rocky Mtn.	Western
District within region	A, B, C	D	E, F, G	H, I, J, K	L, M, N
Additional districts*	D, E, F, G	A, B, C, E, F, G, J	A, B, C, D, H, I, J, K, L	D, E, F, G, L, M, N	F, H, I, K
Number of fuels	50	27	81	55	18
Test	Average	Average	Average	Average	Average
Gravity, °A.P.I.	40.3	39.9	39.8	40.1	40.5
Flash point, P-M closed, °F.	.....	.....	.....	.....	.....
Color A.S.T.M. Union Colorimeter	.....	.....	.....	.....	.....
Viscosity at 100° F.:					
Kinematic, centistokes	2.15	2.24	2.25	2.19	2.08
S.U.s.	33.1	33.5	33.5	33.3	32.9
Cloud test, °F.	.....	.....	.....	.....	.....
Pour test, °F.	.....	.....	.....	.....	.....
Sulfur content, per cent	0.142	0.150	0.202	0.269	0.280
Aniline point, °F.	151	151	152	149	148
Ramsbottom carbon, per cent†	0.064	0.068	0.062	0.053	0.081
Ash content, per cent	0.000	0.000	0.001	0.000	0.000
Cetane number	51.6	51.4	51.2	50.1	48.6
Distillation:‡					
I.b.p., °F.	366	363	366	365	353
10 per cent	409	409	413	408	402
50 per cent	460	467	467	461	456
90 per cent	523	526	531	526	520
End point	566	564	573	571	567

*Some of the fuels are sold in districts of more than one region. †On 10 per cent residuum. ‡On volume recovered basis. Note: All corrosion test results, by A.S.T.M. D130, were negative at 122° and, with three exceptions, were also negative at 212° F.

TABLE 2—SUMMARY OF GRADE 2-D FUELS, POUR POINTS 0° F. AND BELOW

Geographic distribution (region)	Eastern	Southern	Central	Rocky Mtn.	Western
Districts within region	A, B, C	D	E, F, G	H, I, J, K	L, M, N
Additional districts*	D E, F, G	A, B, C, E, F, G, J	A, B, C, D, H, I, J	D, E, F, G, L, M, N	H, K
Number of fuels	44	26	46	21	12
Test	Average	Average	Average	Average	Average
Gravity, °A.P.I.	36.5	35.8	36.4	36.1	33.5
Flash point, P-M closed, °F.	.....	.....	.....	.....	.....
Color A.S.T.M. Union Colorimeter	.....	.....	.....	.....	.....
Viscosity at 100° F.:					
Kinematic, centistokes	2.77	2.96	2.92	2.99	3.32
S.U.s.	35.3	35.9	35.7	36.0	37.0
Cloud test, °F.	.....	.....	.....	.....	.....
Pour test, °F.	.....	.....	.....	.....	.....
Sulfur content, per cent	0.261	0.341	0.321	0.462	0.543
Aniline point, °F.	151	150	154	151	143
Ramsbottom carbon, per cent†	0.105	0.106	0.086	0.063	0.094
Ash content, per cent	0.001	0.001	0.001	0.002	0.002
Cetane number	51.1	51.0	51.5	50.1	45.1
Distillation:‡					
I.b.p., °F.	365	359	372	373	375
10 per cent	436	441	438	434	442
50 per cent	507	517	513	512	521
90 per cent	588	595	594	600	607
End point	647	655	646	653	668

*Some of the fuels are sold in districts of more than one region. †On 10 per cent residuum. ‡On volume recovered basis. Note: All corrosion test results, by A.S.T.M. D130, were negative at 122° and 212° F.

DIESEL-FUEL consumption in the United States reached an all-time high in 1952. Major user of this fuel, which is produced at a rate of more than 11,000,000 bbl. per month by United States refiners, is the railroads. Next largest consumer is the moving equipment on land and water. This group includes trucks, buses, tractors of all kinds, and various water craft. Industrial plants and electric utilities along with the military are the smallest users.

Because of the importance of this type of engine fuel the U. S. Bureau of Mines, under cooperative agreement with the American Petroleum Institute, conducts an annual survey of diesel fuels produced in United States refineries. This survey, first reported on in 1950, covers grades and qualities of diesel fuels being marketed. Information on this type of engine fuel is important to the petroleum industry, engine manufacturers, and consumers.

Samples of the fuels reported in the survey were analyzed by the manufacturers in accordance with instructions from the motor-fuels survey panel of the Automotive Research Committee of the A.P.I. Results of the analyses were sent to the Bureau of Mines where the data were studied and compiled. Portions of this compilation are given in the accompanying tables. Similar data were compiled on the 1950 and 1951 surveys by the Bureau of Mines.

A total of 285 samples of diesel fuel is represented in the present survey. The fuels were manufactured by 46 petroleum-refining companies in 106 refineries, large and small, throughout the country. The data are divided into four groups according to grade of diesel fuel and each group is subdivided into five tabulations according to the geographic marketing distribution of the various fuels represented. The four groups according to A.S.T.M. grades are as shown in Table 5.

A total of 14 laboratory tests, selected by the motor-fuels survey panel of the Automotive Research Committee of the A.P.I. and made by procedures approved by the American Society for Testing Materials, was used to analyze the samples of diesel fuel in this survey. The analyses were made by the refiners on their own products, obtained at the sources of manufacture.

Each group of data is subdivided into five tabulations according to the geographic marketing distribution of the fuels represented. The geographic areas are made up of five general regions divided into 14 marketing districts as follows:

*Petroleum chemist, Bureau of Mines, Bartlesville, Okla.

Six Reasons Why

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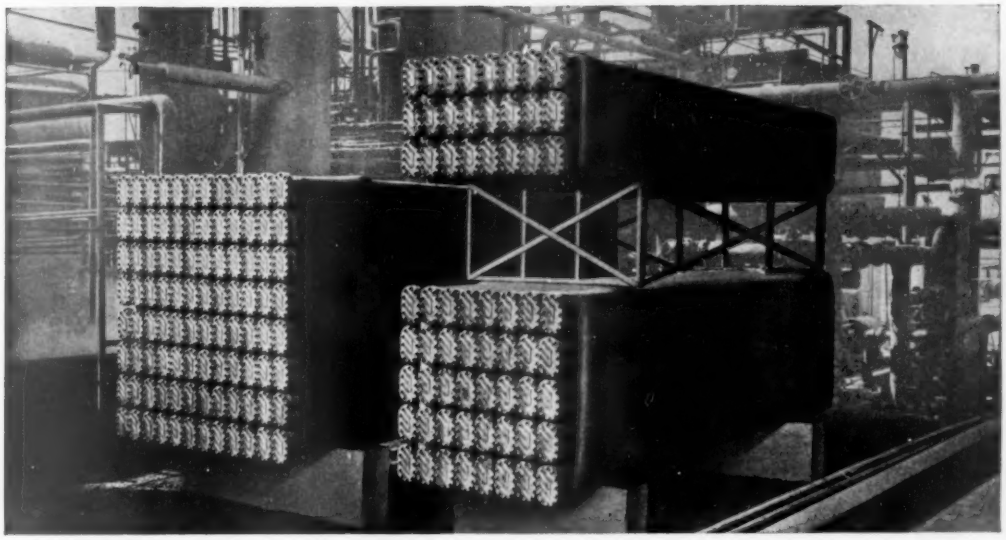

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Southern	D
Central	E, F, G
Rocky Mountain	H, I, J, K
Western	L, M, N

This is a summary of the 1952 survey, published by the Bureau of Mines and identified as Report of Investigations 4935. A copy of R.I. 4935, "National Annual Diesel-Fuel Survey, 1952," may be obtained without charge by writing to the Bureau of Mines, Publications Distribution Section, 4800 Forbes Street, Pittsburgh 13.

TABLE 3—SUMMARY OF GRADE 2-D FUELS, POUR POINTS ABOVE 0° F.

Geographic distribution (region)	Eastern	Southern	Central	Rocky Mtn.	Western
Districts within region	A, B, C	D	E, F, G	H, I, J, K	L, M, N
Additional districts*	D, E	B, C, E, G	B, C, D, I, J	G, L, M, N	I, K
Number of fuels	5	4	10	7	10
Test	Average	Average	Average	Average	Average
Gravity, °A.P.I.	36.9	35.0	36.8	34.8	32.6
Flash point, P-M closed, °F.	.....	.....	.....	.....	.....
Color, A.S.T.M. Union colorimeter	.....	.....	.....	.....	.....
Viscosity at 100° F.:					
Kinematic, centistokes	3.46	3.79	3.65	4.14	3.76
S.U.s.	37.5	38.5	38.1	39.6	38.3
Cloud test, °F.	.....	.....	.....	.....	.....
Pour test, °F.	.....	.....	.....	.....	.....
Sulfur content, per cent	0.087	0.204	0.229	0.421	0.51
Aniline point, °F.	153	158	163	160	147
Ramsbottom carbon, per cent†	0.012	0.090	0.097	0.088	0.125
Ash content, per cent	0.001	0.001	0.001	0.000	0.000
Cetane number	53.7	53.1	54.6	50.3	45.4
Distillation:‡					
I.b.p., °F.	377	396	386	403	390
10 per cent	449	503	463	473	468
50 per cent	527	550	532	540	539
90 per cent	614	599	610	627	622
End point	668	658	663	690	688

*Some of the fuels are sold in districts of more than one region. †On 10 per cent residuum. ‡On volume recovered basis. Note: All corrosion test results, by A.S.T.M. D130, were negative at 122° and 212° F.

TABLE 4—SUMMARY OF GRADE 4-D FUELS

Geographic distribution (region)	Eastern	Southern	Central	Rocky Mtn.	Western
Districts within region	B, C	D	E, F, G	(No analyses	N
Additional districts*	D	B, E, F, G	D	of Grade	
Number of fuels	7	7	2†	4-D fuels)	5
Test	Average	Average			Average
Gravity, °A.P.I.	30.1	29.8			28.5
Flash point, P-M closed, °F.	.....	.....			.....
Color A.S.T.M. Union Colorimeter	.....	.....			.....
Viscosity at 100° F.:					
Kinematic, centistokes	5.68	5.91			6.49
S.U.s.	44.5	45.2			47.1
Cloud test, °F.	.....	.....			.....
Pour test, °F.	.....	.....			.....
Sulfur content, per cent	0.453	0.423			0.91
Aniline point, °F.	145	155			138
Ramsbottom carbon, per cent:					
On 10 per cent residuum	0.246				
On 100 per cent sample	0.313	0.438			0.81
Ash content, per cent	0.002	0.002			0.005
Cetane number	43.9	42.5			39.8
Distillation:‡					
I.b.p., °F.	404	394			372
10 per cent	485	476			460
50 per cent	565	575			551
90 per cent	658	669			668
End point	710	705			.....

*Some of the fuels are sold in districts of more than one region. †No averages were determined as only two samples are represented. ‡On volume recovered basis. Note: All corrosion test results, by A.S.T.M. D130, were negative at 122° and 212° F.

TABLE 5

A.S.T.M. grade—	Maximum dist. temp.	Pour point
1-D	End point, 625° F.	
2-D (first section)	90 per cent point, 675° F.	0° F. and below
2-D (second section)	90 per cent point, 675° F.	Above 0° F.
4-D	Fuels not conforming to above and other limiting specifications	

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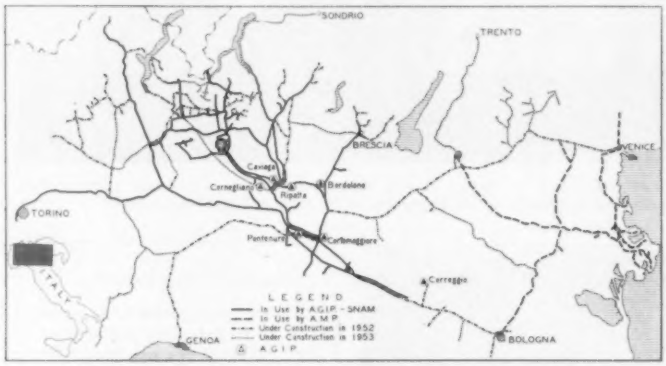


Map of gas pipe-line system in the industrial northern section of Italy.

Postwar Development of Italian Natural-Gas Pipe Lines

by Franco Salimbeni*

GREAT quantities of natural gas were made available to A.G.I.P.-S.N.A.M. (Azienda General Italiana Petroli—Societa Nationale Metanodetti) when Caviaga field began operations just after World War II. Pipe-line construction was carried out on an accelerated scale until in 1948 it was possible to make connection to the Dalmine Steel Mills and start the supply of natural gas to other large industrial plants.

In 1949, natural gas became available to the Milan and Sesto San Giovanni industrial areas.

In 1950 natural gas was made available to Novara, Seregno, Busto Arsizio, Gallarate, Bergamo, and the industrial area of Lecco on Lake Como.

In 1951 A.G.I.P.-S.N.A.M.'s network was extended, reaching important industrial areas such as Varese, Gozzano, Cremona, Brescia, Como, and Magenta.

Present capacity . . . The year 1952 was characterized by beginning operation of the largest natural-gas line in Western Europe, the 129-mile-long Cortemaggiore-Turin pipe line. This 16-in. line can transport as much as 123,600,000 cu. ft. daily to the Piedmont industrial areas.

In addition A.G.I.P.-S.N.A.M. has in operation 373 miles of smaller-diameter lines which permit transportation of about 424,000,000 cu. ft. daily of natural gas to Piedmont, Lombardy, and Emily.

The 16-in. Cortemaggiore - Genoa pipe line is scheduled to be completed during this year and branch lines will be completed bringing service to Casale, Cairo Montenotte, Vercelli, Ivrea, Biella, Schio, Valdagno, and Bassno. With this program completed, A.G.I.P.-S.N.A.M. natural-gas pipe lines will be able to deliver approximately 706,200,000 cu. ft. daily.

TABLE 1—PRESENT STATUS OF A.G.I.P.-S.N.A.M.'S NATURAL-GAS PIPE LINES

In operation on Oct. 1, 1952—	Miles
Large diameter pipe lines*	270
Medium-diameter pipe lines†	331
Small-diameter pipe lines‡	525
Total	1,126
Under construction on Oct. 1, 1952—	
Large-diameter pipe lines*	341
Medium-diameter pipe lines†	168
Small-diameter pipe lines‡	613
Total	1,122
Planned, as of Oct. 1, 1952—	
Large-diameter pipe lines*	41
Medium-diameter pipe lines†	380
Small-diameter pipe lines‡	459
Total	880

*More than 10 in. †Between 10 in. and 6 in. ‡Less than 6 in.

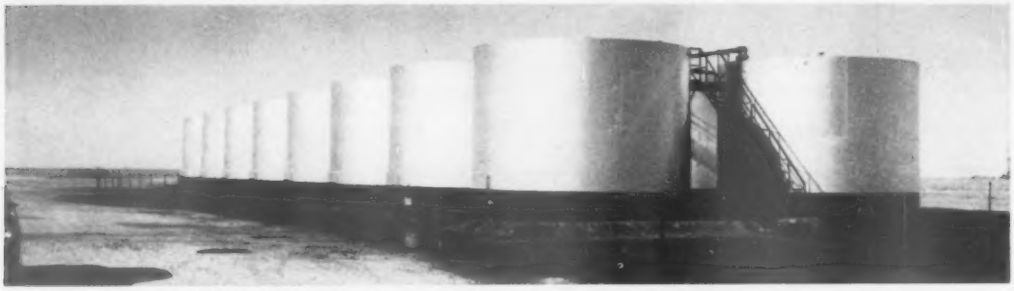
TABLE 2—DETAILED LIST OF NATURAL-GAS PIPE LINES UNDER CONSTRUCTION ON OCT. 1, 1952

	Diam., in.	Length, miles
Cremona-Mestre	16	122
Cortemaggiore-Tortona-Genoa	16	99
Trino-Vercelli	14	11
Vercelli-Cavaglia	12	17
Novara-Cesano Maderno	12	33
Credera-Pagazzano	12	14
Cortemaggiore-Bologna (second stretch)	12	44
Cavaglia-Biella	10	12
Cavaglia-Ivrea	10	12
Correggio-Rubbiera	10	10
Pagazzano-Boltiere	10	9
Pagazzano-Torre Boldone	10	14
Saronno-Tradate	10	9
Romagnano-Borgomanero	8	6
Gattinara-Varallo	8	19
Villadossola-Domodossola	8	6
Vallemosso	7	12
Vedano Olona-Laveno second stretch)	7	9
Gallarate-Sesto Calende-Angera	7	14
Cassago Brivio	7	9
Villacarcina-Gardone Val Trompia	7	6
Rezzato-Vobarno	7	21
Gravellona-Verbania	6	7
Gallarate-Castronno	6	7
Nossa-Clusone	6	5
Bergamo-S. Giovanni Bianco (second stretch)	6	16
Val Sessera	5	7
Carate-Missaglia	5	7
Tromello-Vigevano	5	6
Laveno-Comerio	4	9
Branch lines and connections to industrial consumers		549
Total		1,121

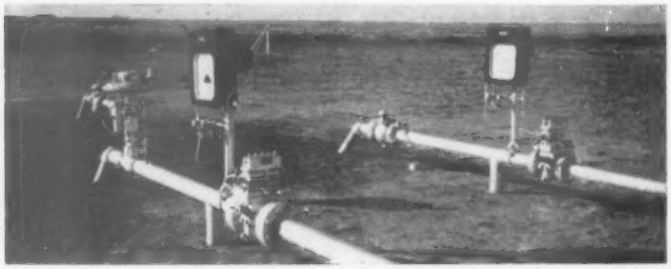
TABLE 3—DETAILED LIST OF NATURAL-GAS PIPE LINES PLANNED ON OCT. 1, 1952

	Diam., in.	Length, miles
Caviaga-Castellanza	14	41
Tortona-Alessandria-Casale	10	31
Mantova-Ferrara	10	50
Verona-Trento	10	56
Vercelli-Gattinara	8	20
Alessandria-Cairo Montenotte	8	47
Vercelli-Novara	7	16
Mandello-Sondrio	7	42
Cologno-Brescia	7	26
Como-Vedano Olona	7	12
Montecchio-Valdagno-Schio	7	37
Vicenza-Thiene-Bassano	7	42
Vigevano-Trecate	5	10
Branch lines and connections to industrial consumers		450
Total		880

*Societa Nazionale Metanodotti, Milan, Italy.



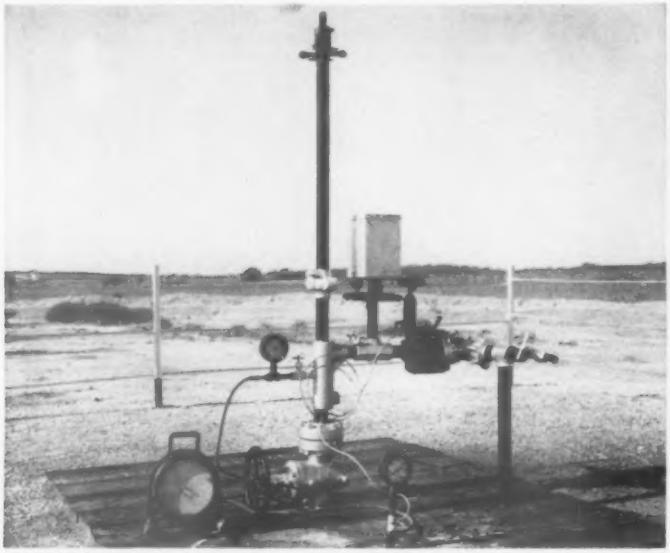
"SUPER" TANK BATTERY—This imposing crude-oil tank battery is reported to be the largest of such storage units in Denton pool of Lea County, New Mexico. There are sixteen 1,000-bbl., all-welded steel tanks on the Phillips Petroleum Co. lease.



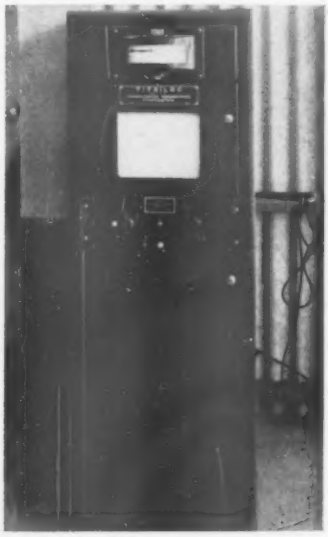
ORIFICE-METER RUN—There are hundreds of orifice-meter runs installed each month in the oil industry. However, this parallel hookup is about as "neat" as they come. These valves, orifice-meter flanges (removable type), orifice-meter recorders, and regulators are installed on the natural-gas meter run at the oil-production battery on Wilshire Oil Co.'s Townsend lease in Lea County, New Mexico.

About These Photos . . .

These photographs of interesting field and plant installations are published for the benefit of petroleum-industry equipment users everywhere. Contributions for these pages are welcome, and those which will be of interest to this subject will be scheduled for early publication. Communicate with "On-the-Job Editor," The Oil and Gas Journal, P.O. Box 1260, Tulsa.



"ON-OFF" FLOWING WELL—This neat flow intermitter was recently installed as part of the surface-equipment hookup on a producer in the Kelly area, Scurry County, Texas. The well is flowing from Pennsylvanian Canyon Reef and is on a lease of Pure Oil Co.



SULFUR CONTENT, AUTOMATICALLY—This compact new recording-type automatic unit accurately and continuously determines the sulfur content of natural gas at El Paso Natural Gas Co.'s Farmington, N. M., natural-gas treating plant.

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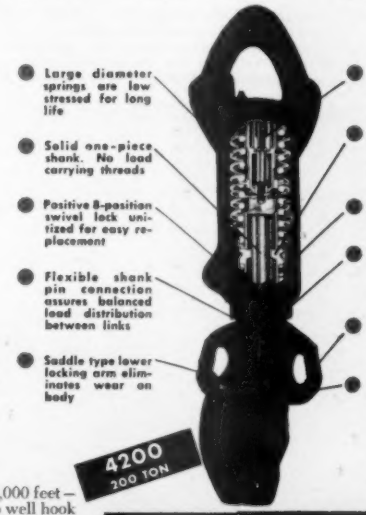
- Hooks rotate easily under all loads
- Close metallurgical supervision throughout manufacture
- "Floating Action" springs for easy handling of all loads
- All BJ hooks made to API standards



- Large diameter springs are low stressed for long life
- Solid one-piece shank. No load carrying threads
- Positive 8-position swivel lock unitized for easy replacement
- Flexible shank pin connection assures balanced load distribution between links
- Saddle type lower locking arm eliminates wear on body
- Sub-shank threads carry up thrust load of springs only
- Swivel ring accurately machined to seat shank when hook fully loaded
- Ball bearings 100% rated for each size hook
- Rugged housing supports load and protects working parts from dirt and grit
- Upper locking arms open downward for easy entrance of links
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To 10,000 feet — Deep well hook designed for average 10,000 foot wells or maximum work load of 200 tons. Weight of hook 4,565 lbs.

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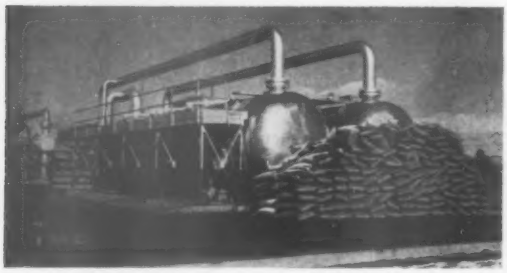
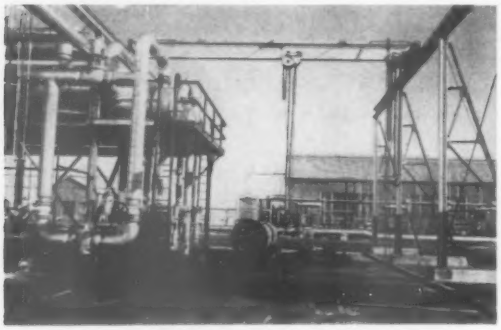
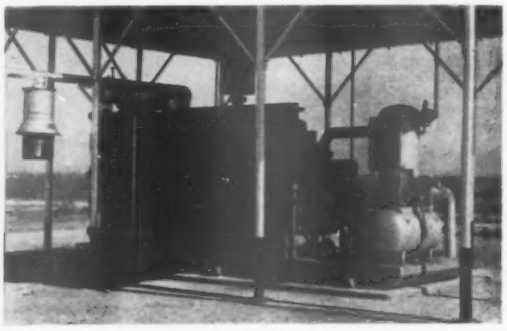


WORLD'S LARGEST!—This big desiccant-type natural-gas-dehydration unit is reportedly the largest horizontal type ever built. It is at El Paso Natural Gas Co.'s new San Juan basin natural-gasoline plant at Farmington, N. M. Note sacked Fluorite desiccant.

WELL "CHECKER-UPPER!"—Accurate gages of oil, water, and natural gas produced by individual wells is an important requirement to many engineering study problems. Skid-type test unit here is on a Standard Oil Co. of Texas well in Howard County, Texas.



HOIST FOR HEAT EXCHANGERS—El Paso Natural Gas Co. is now using this well-engineered traveling-crane section and 12-ton hand hoist for heat-exchanger workovers. The installation is in the new natural-gas-natural-gasoline plant and gas-treating installation at Farmington, N. M. (San Juan basin).



GAS-LIFT COMPRESSOR—Virtually all types of artificial lifting equipment has been used in producing Spraberry trend wells in West Texas, including gas-lift systems. This compressor unit furnishes lifting energy for three Tex Harvey field wells on the John Snowden lease of Magnolia Petroleum Co. in Midland County.

PORTABLE ORIFICE METER — Portable orifice meter recorders find quick and convenient use on many "spot check" gas-flow problems. The test installation here is being used in measuring natural-gas rate from separator unit at tank battery on the Denton (Devonian) lease of Phillips Petroleum Co., Lea County, New Mexico.

TREATING PUMPS—Rotary-electric pumps at El Paso Natural Gas Co.'s new Jal 4 natural-gasoline plant (Jal pool) here are feeding lime solution as part of boiler water treating-conditioning. Through the three parallel units installed, a wide-range flow is possible to care for boiling-water treating requirements.

INSTRUMENT AIR—DRY! This set of parallel installed instrument air dryers is in a new field-processing plant (Jal 4) of El Paso Natural Gas Co. in the Jal area of Lea County, New Mexico. The units shown in this photograph are conveniently switched, one from the other, for absorbent regeneration, electrically.

C. A. ELSIK comes out of a cooling tower on the "gadget" he devised, a . . .

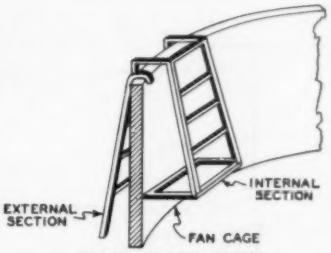


DIAGRAM OF LADDER.

Safety Ladder . . .

that permits access to fans on cooling towers

SAFETY ladders may be easily constructed to permit access to fans on cooling towers.

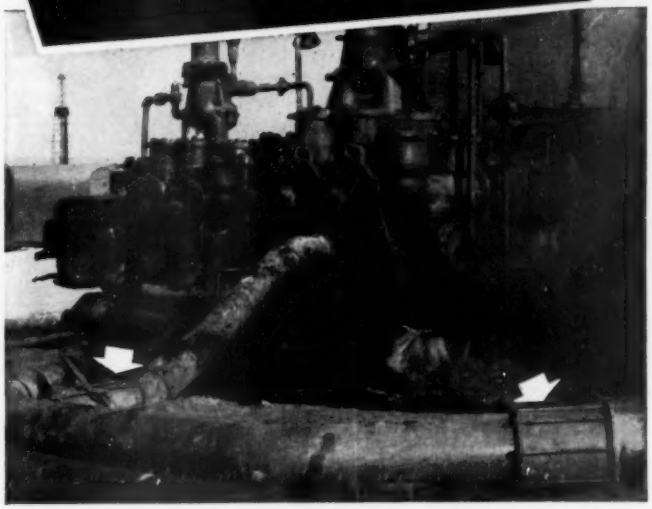
At The Chicago Corp.'s Wardner plant in Agua Dulce field, South Texas, C. A. Elsik (shown above) designed a two-piece safety ladder which provides sturdy footing to the workman and also protects the fan cage.

One piece of the ladder consists of rungs and sides fashioned out of scrap 1-in. pipe. The sides are bent at one end to "hook" over the top of the fan cage, and this section of the ladder is used on the outside of the cage.

The other section is also made from scrap 1-in. pipe, but is somewhat more complicated in shape. Instead of a bent arm to hang on the top of the cage, two short lengths of pipe are welded in the shape of a "U," with one arm of the "U" being a portion of the main part of the ladder. Several rungs are provided to make the ladder long enough so that a maintenance man may climb downward to the fan motor.

Extension . . . At the lower end of the "internal" section of the ladder, a short extension is welded but almost perpendicular to the main ladder and extending toward the cage. The purpose of this is to brace the ladder against the cage providing stability as well as to protect the side of the cage from a free-swinging ladder.

MIGHTY HANDY...to have around a drilling rig



Plenty of uses for Dresser Couplings and Long Sleeves around a drilling rig . . . or anywhere else you've got pipe to join.

Dressers make quick, dependable connections; use Long Sleeves to span gaps. No pipe threading is necessary and the only tool you need is a wrench. Dressers are that simple to join . . . yet you get a permanent "Flexible-Tight" connection every time, even on offset or deflected pipe.

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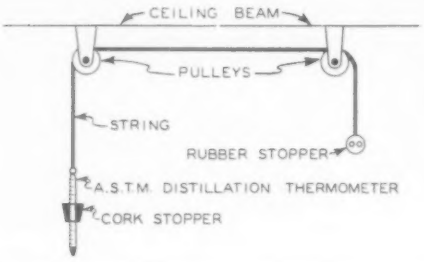
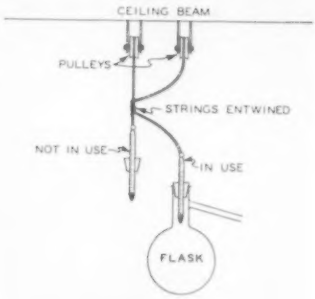


SAFE WAY to use thermometers for taking distillation tests are shown here. At left: Thermometer is tied to string led over two pulleys and counterweighted with rubber stopper. Right: Showing use of thermometer in pairs.



Thermometers . . .

for testing distillation kept safe while not used

MEN working in the testing laboratory at the Silsbee, Tex., gasoline plant of American Republics Corp., have licked the problem of what to do with distillation thermometers when they are not in use making a test. As the result, breakage has been cut down significantly.

In the upper left-hand corner of this page is a drawing showing how the thermometer is tied to a string, which is led over two pulleys and counterweighted with a rubber stopper of the type found in any testing laboratory.

In the upper right-hand corner of the page is another diagram showing how thermometers are used in pairs.

One tests, one rests! . . . One thermometer may be used in a test, while the other one "rests." The two strings holding the two thermometers are entwined to provide an additional safeguard for the one not in use. This insures that the thermometer does not fall and break.

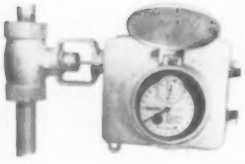
W. R. Duhr is superintendent of the gasoline plant and cycling operation for American Republics at Silsbee field.

ROLLS PISTONS—This device is used for rolling pistons from gas engines when mechanics work on them. Note four wheels at top. The "truck" was devised for use at Sunray Oil Corp.'s Elton, La., gasoline plant. G. E. Boyd is superintendent.

Save HOURS in the FIELD

ENARDO TIME CYCLE SWITCHES

Enardo "MB" and "A" model time-cycle switches pay for their cost in a matter of weeks by drastically decreasing return trips to shut down equipment. These automatic clock mechanisms, provided in 12 and 24 hour operating cycles, can be used to start or stop pumping engines . . . lighting circuits . . . electric motors . . . etc. Normal operating capacity for the "A" Mercury tube switch is 450 Watts open or closed circuit. Tube switches of higher wattage are available on request. The "MB" micro-switch operates at 60 Watts D.C. or 1250 Watts A.C., open or closed circuit. Switches are dust, fire, tamper and explosion proof. Write for Enardo bulletins 10-01, 10-03.



ENARDO CLOCK SHUT-OFF VALVE

The Model "W" Enardo Clock Shut-Off Valve is designed to control the flow of low-pressure gas or liquid and to shut off the supply at a pre-determined time. It is completely automatic and can be safely used on any gas or liquid flow line where pressures do not exceed 100 lbs. Timing mechanism on the valve can be supplied for either 12 or 24 hour operating cycles. The assembly consists of a stainless steel trimmed valve with a cast iron body mounted on a housing containing the valve tripping linkage and clock actuating mechanism. Write for bulletin 10-05.

ENARDO manufacturing company

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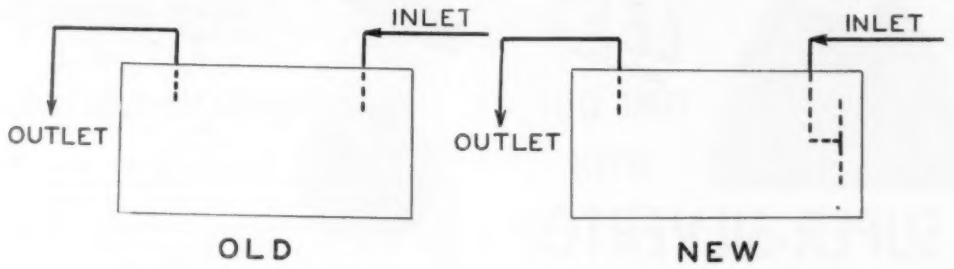

Settling-Drum Improvement

STREAMLINED flow in settling drums, which may contribute to carryover of unwanted constituents, may be broken up by the installation of simple slow deflectors *(see drawings above)*.

Such an addition has proven satisfactory in the caustic-wash settlers used with high-sulfur refined oil.

Prior to delivery to charge tanks of an SO_2 plant, high-sulfur refined oil is caustic washed to remove H_2S. Caustic, charged to the settler, is recirculated until spent.

Deflector . . . Due to the streamline flow of the charge, caustic may be carried over with high-sulfur refined-oil distillate. To change the directional flow and eliminate this carryover, a slotted flow deflector made of 14-gage metal is used at the intake end of the settler drum. Slots are cut in the deflector equivalent to cross-sectional area of 6-in. line.

The slots in the deflector face the end of the settler drum and incoming flow of oil changes direction upon contacting the deflector, hence removing tendency of carryover.

The method was suggested by William C. Dunahoe, operator, at Humble Oil & Refining Co.'s Baytown, Tex., refinery.

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Do you have an idea which will save time, money, or effort on your job—either in the fields or in the plants? Then why not let others know about it?

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OPERATION

Adjustable to hold circuit to magnetic controller until pointer reaches set high or low point. When pressure reaches set low or high point after motor is running, switch stops motor automatically.

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FLANGE & HOOK DIVISION

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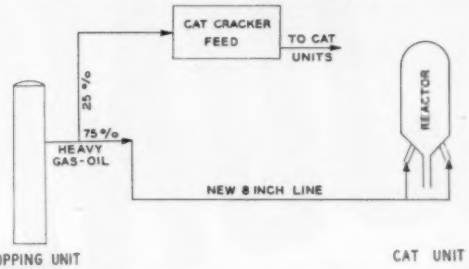
Catalytic Unit Heating Arrangement



INSTALLATION of an 8-in. line tying a topping unit directly in with the feed line to a fluid catalytic cracking unit has lowered heat requirements for the cat cracker at Cities Service Refining Corp.'s Lake Charles, La., plant.

The fluid unit had been operating under such conditions that it required additional preheat capacity which was not conveniently available. Under the operational procedure, heavy gas-oil from the topping unit was circulated through heat exchangers and then sent to cat cracker feed tanks, where the temperature would be further lowered.

The present arrangement calls for the flow of 75 per cent of the heavy gas-oils from the topping unit to be charged with controlled flow and solenoid protection to the feed lines of the cat unit, with necessary flow controls installed to shunt 24 per cent of the flow to the cat cracker feed storage tanks for makeup purposes.

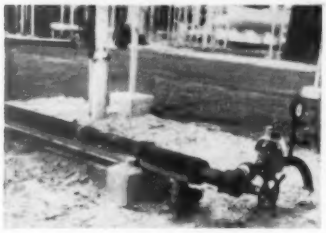
How it works . . . The modified flow:

1. Provides additional feed preheat directly to the cracking unit.

2. Reduces the catalyst circulation which increases the liquid recovery.

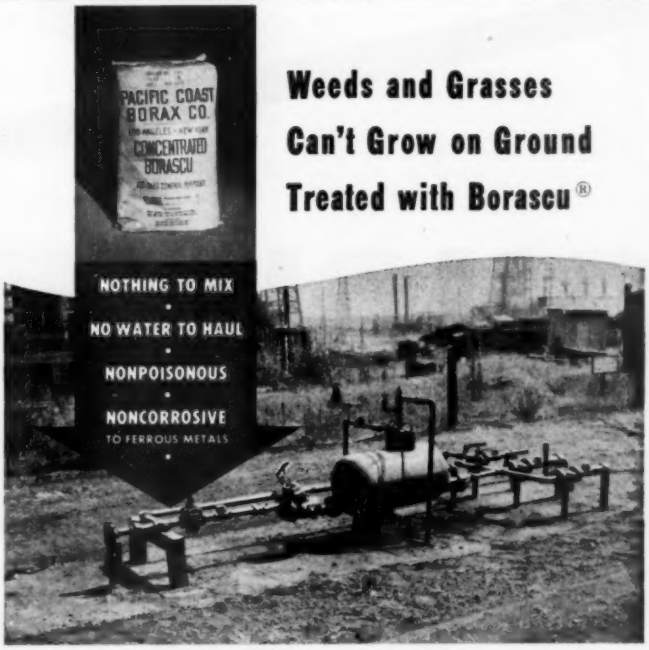
3. Increases the steam production on the cat cracker.

4. Saves the water previously used to cool the heavy gas oil at the topping units.



Exhaust Steam Utilized

Exhaust steam is utilized in this double-pipe heat exchanger at Sunray Oil Corp.'s gasoline plant at Elton, La. Going into the exchanger, pressure on distillate is reduced from field pressure of 2,700 psi., to 750 psi. through the Thornhill-Craver long-nose reduction valve at right. The distillate is thus heated, during expansion to the lower pressure, by condensing steam. Use of the exchanger eliminates the need for a tubular heater, and reduces cooling-tower load by condensing the exhaust steam therein.



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LOOK FOR THE GREEN RODS

GAS TURBINES AND CENTRIFUGAL COMPRESSORS—2

Centrifugal-Compressor Flexibility

by T. R. Rhea* and J. S. Quill*

THE flexibility of adjustable speed centrifugal compressors in meeting the varying flow and pressure conditions encountered in a pipe line is readily demonstrated by superimposing the compressor characteristics and the pipe-line flow-pressure characteristics.

Performance charts . . . Fig. 1 shows the pressure-flow characteristics of two compressors in series in a station. This chart is based on the calculated performance of the actual designs which are to be applied to Cornudas station of the El Paso system. (A map of the El Paso Natural Gas Co. system appeared in last week's installment.)

*General Electric Co., Schnectady N. Y. From paper presented at A.S.M.E. meeting, December 1952.

A family of such compressor characteristics is required to illustrate the range of possible performance. Fig. 1 is the characteristics when the discharge pressure is maintained at 813 psia. Characteristics at other discharge pressures for the specific compressors could be readily obtained from the compressor manufacturer, but this chart will serve to illustrate the point.

The next step is to calculate from a suitable pipe-line formula (Panhandle in this case) the system pressure maintained at Cornudas for different values of Guadalupe discharge pressure. Pressure-flow characteristics calculated for 813 and 750 psia. pressure at Guadalupe are superimposed on the compressor characteristics with the results shown in Fig. 1.

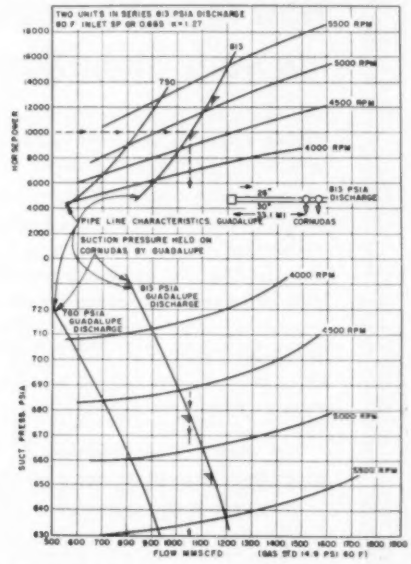


Fig. 1—Centrifugal-compressor and pipe-line characteristics superimposed.

Using chart . . . Having determined these combined characteristics it is possible to ask specific questions about flow and pressure and the ability of the Cornudas centrifugal compressors to maintain flow and pressure.

For example, Cornudas has an available summertime (80° F. ambient) output of 10,000 hp. When Guadalupe is maintaining 813 psia. discharge, what flow can Cornudas pump back up to 813 psia. discharge pressure?

From Fig. 1 the answer of 1,050 million standard cubic feet per day is obtained by following over the 10,000-hp. line until the pipe-line characteristic is reached. Also the information is obtained that the two turbines will run at approximately 4,750 r.p.m. each and Cornudas will have a suction pressure of approximately 678 psia. This is the "design point" of the centrifugal compressors, as discussed later.

Suppose now that the wintertime (40° F. ambient) horsepower of 12,800 is available at Cornudas. How much flow can be pumped up to 813 psia. discharge assuming Guadalupe can maintain its discharge pressure of 813 psia.?

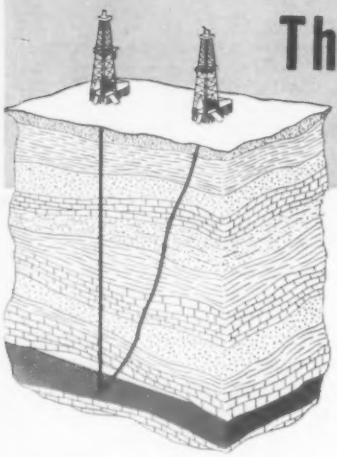
From Fig. 1 a flow of 1,140 million standard cubic feet per day is indicated and the turbines will have to be speeded up to approximately 5,200 r.p.m. to maintain this flow.

But now suppose that the upstream station of Guadalupe is only able to maintain 750 psi. discharge, what flow could Cornudas pump up to 813 psia. discharge pressure?

Reference to Fig. 1 shows that the two turbines delivering their maximum 12,800 hp. could deliver 930 million standard cubic feet per day at 813 psia. They would be required to run at their maximum speed of 5,500 r.p.m.

The SINGLE SHOT

IS WORTH ITS WEIGHT IN PLATINUM TO YOU



Generally a straight hole is the most economical distance from your derrick to bottom. The Sperry-Sun Single Shot will help keep your hole running the way you want it with little effort and little expense.

Knowing exactly your inclination and direction at all times is worth more to you than even the cost of a solid platinum Single Shot instrument. And the Sperry-Sun Single Shot gives you this vital information quickly and accurately at but a trifling cost.

The Single Shot prints the inclination and direction on a photo-paper disc. It will give a valid reading only when the instrument is at rest, thus providing a positive check of the accuracy of the reading. Loading and developing the photo-disc and running the survey are so simple that practically anyone can do it. The Single Shot may be run in an open hole, or, using a non-magnetic drill collar (rented from Sperry-Sun) it may be go-devilled or run in on a wire line.

It is just good insurance to run Sperry-Sun Single Shot Surveys in every hole you drill—exact inclination and directional measurements can easily be worth a hundred times the cost involved.

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by
Ralph F. Nielsen*

Unsteady State Flow of Gases in Porous Media—(Transient Effects)

THE usual equations for the linear and radial flow of gases through porous media, in particular those used in permeability determinations, are for steady-state isothermal flow. The term "steady-state flow" commonly applies to flow such that there is no change with time in the amount (mass) of fluid per unit volume of porous medium at any point. For instance, when air permeability is measured on a core, sufficient time is allowed so that the weight of air entering one side of the core per unit time is equal to that leaving the other side.

If a closed reservoir, which is under pressure, is tapped at some point, the sudden drop in pressure at this point will not immediately be "felt" at some distant point. There must be expansion in order to realize a pressure drop, and this expansion cannot take place until some material has had time to escape from the intervening space. There is thus a short transient period before a sudden pressure drop at one point has manifested its effect at some distant point. The calculation of this transient effect will be illustrated for the simple cases of linear and radial flow of a gas.

Linear Case

Consider a long core of uniform cross-section, sealed in a sheath such that a fluid can only flow lengthwise. Assume this core to be pressured up to P_1 atm. with a gas. Assume, also, that one end is suddenly opened to a low pressure which, for convenience, is taken as zero. A transient effect moves toward the other end and, at some time t has progressed a distance x_o (Fig. 1). Beyond this point the pressure is still P_1. The pressure distribution between x_o and the open end is somewhat doubtful, but it will be assumed that it is the same as for steady-state isothermal flow of a perfect gas. For such flow the square of the pressure varies linearly with distance, that is:

$$P^2 = P_1^2\, x/x_o \text{ or } P = P_1\,(x/x_o)^{1/2} \quad (1)$$

The volume of gas dQ, corrected to 1 atm., contained in a slice dx cm. thick is:

$$dQ = \phi\, A\, P\, dx = \phi\, A\, P_1\,(x/x_o)^{1/2}\, dx \quad (2)$$

where A is the cross-section area and ϕ the fractional porosity. The total Q contained in the transient up to x_o is found by integrating Equation 2:

$$Q = 2/3\; A\, \phi\; P_1 x_o \quad (3)$$

The change of Q with time, dQ/dt, must be equal to the production rate. If this is given by the usual linear formula for gases we can write:

$$\frac{dQ}{dt} = 2/3\; A\; P_1\; \phi\; \frac{dx_o}{dt} = 1/2\; \frac{K\, A\, P_1^2}{\mu\, x_o} \quad (4)$$

where K is the permeability in darcies and μ the gas viscosity in centipoises. Transposing and integrating gives the time t in seconds required for the transient to travel a distance X cm.:

$$t = 2/3\; \mu\; X^2\; \phi / K\; P_1 \quad (5)$$

For example, consider a 10-md. core of 10 per cent porosity 100 cm. long pressured up to 5 atm. abs. with air (μ = 0.018 cp.) and one end suddenly released to vacuum. The time required before any pressure drop occurs at the other end is 240 seconds.

Radial Case

Making the same assumptions as for the linear case, we may consider that the transient has progressed to r_o, r_w being the radius of the "well" (Fig. 2). If the pressure distribution in the transient is the same as for steady-state flow:[1]

$$P^2 = \frac{P_1^2 \ln (r/r_w)}{\ln (r_o/r_w)} \quad (6)$$

The amount dQ contained in an annular space dr cm. thick is:

$$dQ = 2\pi r h\, \phi\, P\, dr \quad (7)$$

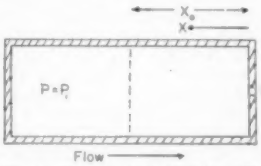

Fig. 1—Movement of transient effect in linear unsteady-state flow.

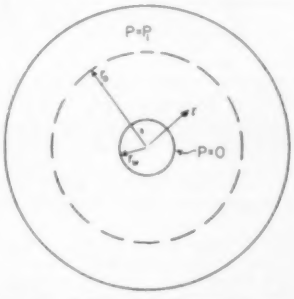

Fig. 2—Movement of transient effect in radial unsteady-state flow.

To avoid an unwieldy expression for P, let $y = \ln (r/r_w)$, $z = \ln (r_o/r_w)$. Then $r = r_w e^y$, $dr = r_w e^y\, dy$, and $P = P_1\,(y/z)^{1/2}$. Substituting in Equation 7:

$$dQ = \frac{2\pi r_w^2\; P_1\; h\; \phi\; (y)^{1/2}\, e^{2y}\, dy}{(z)^{1/2}} \quad (8)$$

Since r_w is small, the total amount from r_w to r_o may be taken as being from r = 0 to $r = r_o$ or, in terms of y, from $y = -\infty$ to y = z. The integral of $(y)^{1/2}\, e^{2y}\, dy$ cannot be obtained directly and will therefore only be indicated. Whence:

$$Q = 2\pi r_w^2\; P_1\; \phi\; z^{-1/2} \int_0^z (y)^{1/2}\, e^{2y}\, dy \quad (9)$$

Again, the rate at which the total quantity of gas Q changes is equal to the production rate given by the radial flow formula for gases. In the above notation:

$$\frac{dQ}{dt} = \frac{dQ}{dz}\,\frac{dz}{dt} = \frac{d}{dz}$$

$$\times\; [2\pi r_w^2\; P_1\; \phi\; z^{-1/2} \int_0^z (y)^{1/2}\, e^{2y}\, dy]\; dz/dt$$

$$= \frac{\pi\, K\, h\, P_1^2}{\mu\, z} \quad (10)$$

The integration of Equation 10 is a bit lengthy but leads, with some approximations, to:

$$t = \frac{r_o^2\, \mu\, \phi}{4\, K\, P_1} \quad (11)$$

where t is the time in seconds for the transient to move out to r_o cm. from the well. The absence of the well radius in the expression is due to the fact that the smaller the well radius the more the pressure drop is concentrated near the well and the less is the amount of gas removed.

As a numerical example we may consider a gas well that has been shut in and suddenly opened to full flow. If the shut-in pressure is 200 atm., the permeability 100 md., the porosity 15 per cent, and the gas viscosity 0.01 cp., the time required for the transient to move out 500 ft. is:

$$t = \frac{500^2 \times 30.5^2 \times 0.01 \times 0.15}{4 \times 0.1 \times 200}$$

$$= 4{,}700 \text{ seconds}$$

Although the above equations were derived for zero well pressure, they apply approximately when the well pressure is small compared to the reservoir pressure.

References

1. J. C. Calhoun, This Series, "Darcy's Law—Radial Flow System," No. 315, January 8, 1948.

2. Muskat, Flow of Fluids in Porous Media, McGraw-Hill.

*Associate professor, petroleum and natural-gas engineering, Pennsylvania State College.

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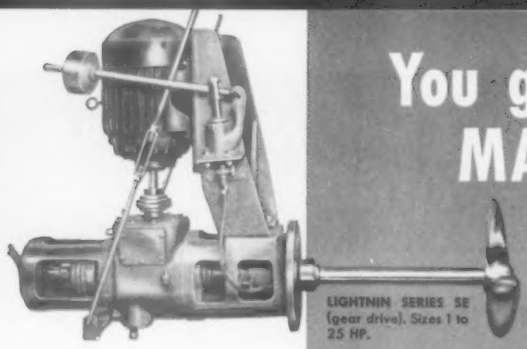

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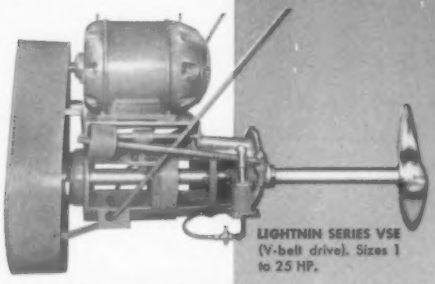

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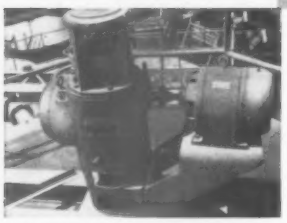

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ALLOY STEELS FOR OIL REFINING—3

Pressure-Vessel Alloys*

CASTINGS are used in oil refineries, usually for the same applications as forgings. Therefore, the development of cast alloy steels for refinery service has paralleled that for forged alloy steels with such variations in chemical compositions as are necessary because of the melting practices involved.

Pressure Vessels

Processing of oil at temperatures of about 550° F. and upwards, especially with sour crudes, led to corrosion at exorbitant rates of the walls and internals of pressure vessels, heat-exchanger shells, and other pressure-containing equipment. The refining industry about 1925 specified the use of stainless steel, 18 per cent chromium-8 per cent nickel, for liners for pressure vessels because of its corrosion and oxidation resistance. This chromium-nickel alloy proved to be more than adequate for most applications.

The 16 to 18 per cent chromium steel alloys are of the age-hardening type and, because of cracking difficulties encountered, materials with more suitable characteristics were sought. It was found that the 11 to 13 per cent chromium steel alloys, such as the Type 405 with ¼ per cent aluminum and the Type 410 low-carbon alloys, provided suitable corrosion resistance for many conditions.

The 4 to 6 per cent chromium material used in solid alloy parts was unsuitable for linings because of its air-hardening characteristics and the dilutions resulting from the welding of the alloy to the carbon steel. Thus, for the bulk of pressure vessels used in the refining industry, critical alloy materials have been held to a minimum by using thin corrosion-resistant liners in thicknesses generally less than ⅛-in., which is a small percentage of the total thickness of the vessel wall.

Alloy plate or sheet . . . Since corrosion was encountered on both sides of the internals, it was necessary to fabricate them of solid plate material. In many applications, 4 to 6 per cent chromium-½ per cent molybdenum material was sufficient to combat corrosion. However, under severe corrosive conditions, higher alloys were necessary and internals fabricated from relatively lightweight 11 to 13 per cent chromium alloy sheet were developed and are finding wide use. Under the more severe conditions chromium-nickel alloys, such as Types 304, 316, and 347, are required for internals.

For extremely corrosive conditions, particularly by acids at temperatures below the dew points of the acids, it has been necessary to use alloys such as Type 316 and Monel for internals, as well as for linings, to provide the corrosion resistance required for continuous and safe operation of pressure vessels.

About 1937 data had been developed on the creep strength of carbon steels with the addition of ½ per cent molybdenum, which would permit higher stresses than those for carbon steel at elevated temperatures in the range of 750° to 900° F. This resulted in a corresponding reduction in wall thickness of the pressure vessels and eliminated cracking difficulties that had been encountered in service at connections due to thermal stresses induced in heavy sections during operation.

Cat cracker alloys . . . With the advent of catalytic cracking processes during World War II at operating temperatures of 950° F. and above and relatively low pressures, the designs were based on the use of carbon steel for the pressure-carrying walls of the vessels. However, inspections of this equipment during the last year have shown evidence of graphitization, and a number of reactors of integrally-clad construction have been found to contain cracks after some years of service. In these reactors, examination has detected graphite in the carbon steel base metal and heat-affected zones. To overcome this condition, replacement construction in one case has been specified with steel containing additions of chromium and molybdenum as covered in A.S.T.M. Specification A-301 Grades A and B.

Catalytic reforming processes . . . These operate at elevated temperatures in combination with high pressures. The temperature ranges from 900° to 1,100° F. and requires a material with high creep strength, as well as resistance to graphitization. For the same reasons cited above under the history of alloy steel development, the standard ferritic alloys that have proved satisfactory in service under these conditions contain either 0.5 per cent or 1.0 per cent molybdenum. The materials presently being used for catalytic reforming processes are the 2¼ per cent chromium-1 per cent molybdenum grades or the 4 to 6 per cent chromium-½ per cent molybdenum grades.

It is common practice in the industry to use carbon steel for pressure vessels, heat exchanger shells, and similar pressure-containing equipment unless corrosive conditions dictate the need for corrosion-resistant materials. The alloy steels which have been most frequently used are as follows:

1. Carbon-0.5 per cent molybdenum.
2. 0.5 per cent chromium-0.5 per cent molybdenum.
3. 1 per cent chromium-0.5 per cent molybdenum.
4. 1.25 per cent chromium-0.5 per cent molybdenum.
5. 2.25 per cent chromium-1 per cent molybdenum.
6. 5 per cent chromium-0.5 per cent molybdenum.

Where temperature, oxidation, chemical attack, or combinations of these conditions govern, the metals and alloys which have been used as liners or occasionally as solid-walled vessels are as follows:

1. Type 405 or 410, 11 to 13 per cent chromium.
2. Type 304, 18 per cent chromium-8 per cent nickel.
3. Type 347, 18 per cent chromium-8 per cent nickel + columbium.
4. Type 321, 18 per cent chromium-8 per cent nickel + titanium.
5. Type 316, 18 per cent chromium-8 per cent nickel + molybdenum.
6. Hastelloy B.
7. Monel.
8. Nickel.

*From report by A.P.I. Interim Advisory Committee on Alloy Steels, 1952.

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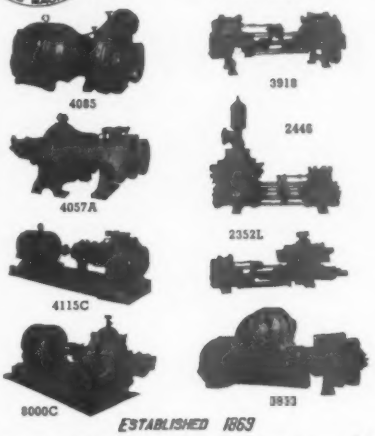

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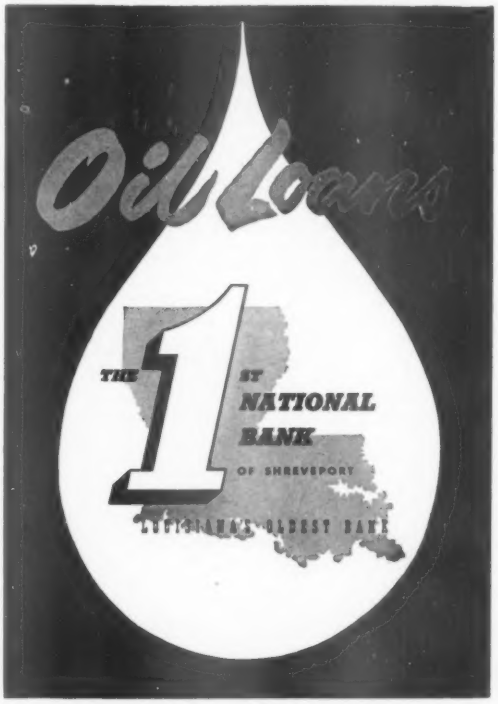


by Thomas M. Newell*

How Inhibitors Prevent Corrosion in Oil Wells—2

THE subject of prevention of oil-well corrosion by use of inhibitors was initiated last week. At that time it was pointed out that some polar organic molecules will form tenacious films on steel surfaces, thus preventing corrosive brine from contacting the metal. The basic building blocks for the polar compounds are long straight-chain hydrocarbons.

The polarity of these materials is created by insertion into each molecule one or more atoms of elements other than carbon and hydrogen. The most effective of these are nitrogen, sulfur, and oxygen.

Molecules consist of dense, positively charged atomic nuclei which are held together in the molecule by negatively charged electrons. These electrons revolve about these nuclei with speeds approaching that of light. In a nonpolar molecule, of which a hydrocarbon or oil molecule is an example, the average center of all the negative electrons and of all the positive nuclei coincide so that the molecule is electrically balanced. If, in such a molecule is placed a nitrogen atom—for example—at or near one end of a rod-shaped molecule, or at the vertex of a "V" or "Y"-shaped molecule, the average centers of negative electricity and of positive electricity no longer coincide. The greater the separation of the positive and negative centers of electricity, the greater is the polarity of the molecule.

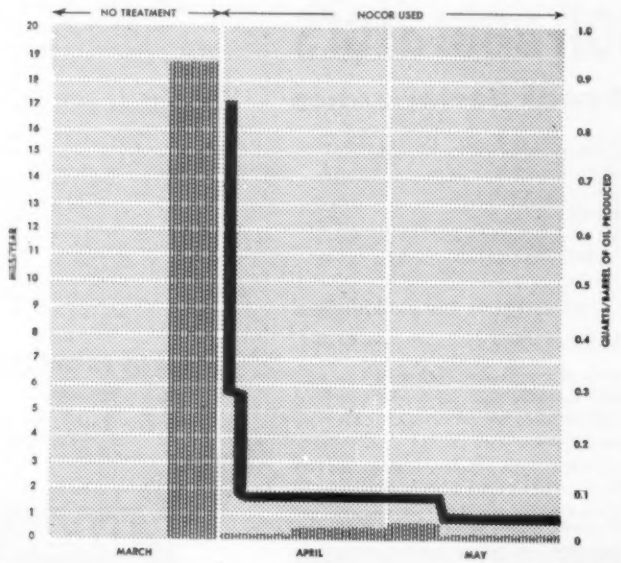
This is a result of the fact that the positive nucleus of an atom such as nitrogen possesses a stronger attraction for electrons than do the nuclei of carbon and hydrogen atoms, with the result that all the electrons of the molecule shift slightly toward the nitrogen atom. Thus polarity is in reality the result of an unbalanced electrical force field, or "dipole" (two poles: one positive, one negative), present in a molecule. When the polar portion of a molecule approaches other matter, for example, a steel surface, it induces an opposite force field in the steel with the result that the polar organic molecule and the steel surface attract one another, and the polar molecule adsorbs, or sticks to, the steel surface.

The magnitude of the polarity determines to a large extent the tenacity with which the molecule adsorbs to the steel. Another major factor which determines the tightness with which a polar molecule adsorbs is the position of the polar group in a molecule. The polar group must be at a point such that the molecule can orient itself in such a fashion so as to permit the polar group to move into close proximity to the steel surface.

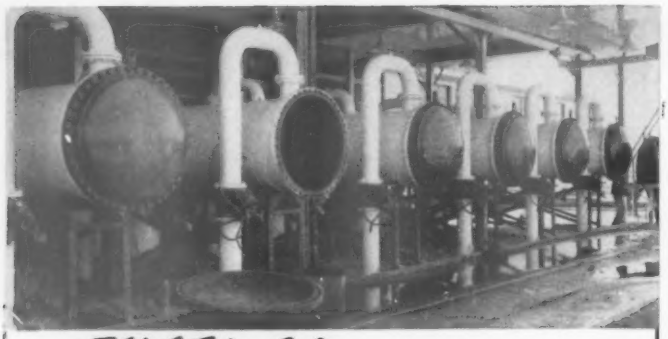
Physical adsorption . . . Adsorption such as this is known as physical adsorption. The forces involved are strange to our everyday experiences, so that, in spite of the fact that physical adsorptive forces and magnetic forces are entirely different phenomena, it is useful to think of polar molecules as those which contain small magnets within themselves, and that these magnets attach themselves to a steel surface and orient the entire molecule at a particular angle to the surface, which angle is characteristic of a given molecular structure.

The best inhibitor of the above type is one with maximum adsorptive force and which orients itself normal to a steel surface so that adjacent inhibitor molecules can close pack like bristles on a brush to give a dense, impenetrable film on steel. Further, the molecule should not possess a complex geometry of side chains and ring structures which interfere with close packing.

*Director of research, Cardinal Chemical, Inc.



Graphic corrosion results before and after inhibitor treatment in a well in Jordan pool, south of Penwell, Tex. The base line corrosion rate of 18.8 mils per year is an average based on weight loss.



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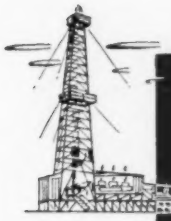


Shell 1-A-1 Andrews Opens Ellenburger Field

by Joseph A. Kornfeld
District Editor

ONE of the most prolific Ellenburger discoveries in the Permian basin was completed during January, 8 miles south and east of the city of Andrews, county seat of Andrews County, Texas, in the Central Basin platform sector.

The discovery well is Shell Oil Co. 1-A-1 Andrews, C SE NE Section 16, Block 1, University Lands Survey, which flowed 470 bbl. of 51.5°-gravity oil from 12,540-60 ft. and from 12,571-87 ft. in the Ellenburger dolomite.

The strike is located on a block of 2,560 acres owned by Shell. Nearby acreage holders include Humble Oil & Refining Co., The Texas Co., Ohio Oil Co. and Forest Oil Corp.

The nearest developed oil production lies 2 miles to the southwest at the Wolfcamp (Permian) discovery well of Humble "O"-1 State, C SE SW Section 20, Block 1, productive at 7,082 ft. which was completed on November 18, 1951.

Earlier, this discovery showed for commercial production from the Wichita-Albany (Permian) series, the Wolfcamp (Permian) series, the Devonian and the Ellenburger dolomites.

Wichita-Albany . . . From the Wichita-Albany series, the well returned 3,825 ft. of heavily gas-cut oil, 935 ft. of clean 35°-gravity oil, and 190 ft. of heavily oil-cut mud on drill-stem test run at 7,704 ft., with packer set at 7,657 ft.

Wolfcamp series . . . The best oil recovery on drill-stem test in the Wolfcamp series was following a 2-hour test at 8,312 ft. with packer set at 8,282 ft.; recovery was 6,677 ft. of 40°-gravity oil and 210 ft. of mud-cut oil.

Devonian . . . A drill-stem test run at 10,825 ft. in the Devonian with packer set at 10,749 ft., recovered in drill-pipe 150 ft. of gas-cut mud, 270 ft. of oil and gas-cut mud, and 150 ft. of mud and gas-cut oil.

Drilling Processes

Shell's 1-A-1 State was drilled on contract by Rig 5 of Carl B. King Drilling Co. of Texas. This is a "100" rig powered by three LRO butane-powered engines connected to draw works. A single LRO engine for standby affords extra emergency power. Mud pumps are C-250 and C-350 models.

The rig is mounted on a 7-ft.-high substructure equipped with 3-ft. wooden sills, placing it 10 ft. off of the ground. A standard 136-ft. steel derrick with 30 by 30-ft. base is used.

Straight-hole digging . . . A feature of the drilling of this discovery well is that the deviation was generally ¾° or less throughout the entire drilling process with the exception of a swing out to 2½° at 7,000 ft.; however, this deviation was corrected back and the hole finished within ¾°. In this connection, drill-collar practice was to run 7-in. o.d. collars under the surface pipe from 436 ft. When the shoe was drilled under the protection pipe at 4,709 ft. crews picked up 10 more collars. Four-and-one-half-inch drill pipe was used throughout.

Bit requirements . . . A single 17½-in. bit was used to cut the surface hole to 436 ft. For the protection string twenty-one 11-in. bits were used in drilling to 4,709-ft. casing seat.

In digging the long hole 136 bits were used in drilling from 4,709 ft. to 12,635 ft., total depth. However 17 bits were used prior to taking drill-stem tests and these bits were not rerun, consequently they did not get full usage and the bit consumption appeared high on that account.

Days to drill . . . Contract used 132 days from moving on to reach the top of the Ellenburger pay at 12,570 ft. However, from move on to move off required a total of 143 days. Of this total there were 20 days of day work.

Completion . . . After the shoe was drilled in the 5½-in. pipe set and cemented at 12,625 ft. with 165 sacks, crews deepened 10 ft. to total depth of 12,635 ft. The well was plugged back to 12,609 ft. and gun perforator run from 12,540 to 12,560 ft. and from 12,571 to 12,587 ft. Shot-hole density was four bullets per foot. Packer was run on tubing and the well was completed by displacing mud with oil.

On initial 24-hour potential test, the well flowed 470 bbl. of 51.5°-gravity oil (cut 0.2 per cent basic sediment) per day through a 10/64-in. choke. Initial produced gas-oil ratio measured 396 cu. ft. per bbl. Shut-in well-head pressures on tubing and casing gaged 1,500 psig.

BORE-HOLE SIZE, CASING AND CEMENTING PROGRAM

Bore-hole diameter (in.)	Casing diameter (in.)	Casing seat (ft.)	Cement used (sacks)
17½	13⅜	436	400
11	8⅝	4,709	2,700
7⅞	5½	*12,625	165

*Total depth 12,635 ft.; well deepened into Ellenburger dolomite 10 ft. with rotary tools after the cement plug was drilled.

MUD PROGRAM AND MUD PROPERTIES

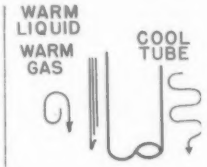
Item—	Drilling-fluid characteristics— Weight (lb./gal.)	Viscosity (cc. A.P.I.)	Water loss (cc.)	Filter cake (in.)
Native mud to 4,700 ft.	11.0	45.0	60	3/32
Below 8⅝-in. pipe	8.8	38.0	22	3/32
	9.2	100.0	8	2/32
Completion operations	9.5	95.0	6	2/32

Part 24 of a series

by Dr. B. E. Lauer, Head, Department of Chemical Engineering, University of Colorado

h_f HEAT TRANSFER

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a COOL TUBE and WARM GAS OR LIQUID



Tube Position: Vertical

Fluid Movement: Natural Convection: Streamline Flow. Turbulent.

Direction of Movement: Parallel to tube.

Data relating to the cooling of a gas or liquid on the outside surface of a vertical tube in those cases in which the liquid is flowing parallel to the length of the tube are very meager. Two situations actually prevail, one in which the tube stands as a column in the bulk fluid and one in which the tube is surrounded by a second tube of larger diameter to give an annulus through which the fluid may be circulated.

In the first case equations of the type used for a vertical plane are suggested as being satisfactory.(see sections A 1 and 2).

For situations of the second type, equations appropriate for the estimation of the film coefficients in the inside of a pipe are (see sections E 1 and 2), with a slight modification, probably suitable. This modification is as follows:

The term D, the diameter of the tube, must be replaced by the term D_e, or equivalent diameter. D_e is obtained by application of the following equation:

$$D_e = \frac{D_2^2 - D_1^2}{D_1}$$

In order to test the conditions of flow, the Reynold's number should be calculated using an equivalent diameter D_e' with $D_e' = D_2 - D_1$.

TERMINOLOGY:

- D - Diameter of inside of tube, ft.
- D_1 - Diameter of outside surface of inside pipe, ft.
- D_2 - Diameter of inside surface of outside pipe, ft.
- D_e - Equivalent diameter for heat transfer, ft.
- D_e' - Equivalent diameter for flow calculations, ft.
- D_o' - Outside diameter of tube in inches.

SIMPLIFIED EQUATION: For natural convection. Air cooled on a long vertical tube.

$$h_f = 0.5 \left(\frac{\Delta t_s}{D_o'}\right)^{0.25}$$

Δt_s = temp. surf. - temp. gas, °F.

REFERENCES:

1. Mechanical Engineers' Handbook, Lionel S. Marks, Fourth Edition, p. 401.
2. Heat Transmission, William H. McAdams, p. 248.
3. Chemical Engineers' Handbook, J. H. Perry, p. 474.

G 1 and 2

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a COOL TUBE and CONDENSING VAPOR

Tube Position: Vertical

Vapor Movement: Natural Convection.

EQUATION:

$$h_f = 0.0084 \left[\frac{w}{\mu D_o}\right]^{0.4} \left[\frac{k^3 \rho^2 g}{\mu^2}\right]^{\frac{1}{3}}$$

TERMINOLOGY:

- h_f - Film coefficient of heat transfer, BTU/hr. sq. ft. °F.
- k - Thermal conductivity of condensate film at t_f, BTU/hr. sq. ft. °F./ft.
- ρ - Density of condensate film at t_f, lb./cu. ft.
- g - Gravity factor, 4.18×10^8 ft./hr.^{2}
- Δt - Temperature of condensate minus temperature of surface °F.
- μ - Absolute viscosity of condensate film at t_f lb./hr. ft.
- D_o - Outside diameter of tube, ft.
- L - Length of tube, ft.
- w - Rate of condensation of pure saturated vapors on vertical tube, lb./hr.
- λ - Latent heat of condensation, BTU/lb.
- t_f - Average temperature of film, °F. This temperature is taken to be $t_v - 0.75 (\Delta t)_m$.
- t_v - Temperature of saturated vapor, °F.
- Δt_m - Average value of terminal temperature differences.

SIMPLIFIED EQUATION:

for steam $h_f = \frac{4000}{(L)^{1/4} (\Delta t)^{1/3}}$

Δt from 10°F to 150°F

LIMITATIONS: When the value of the expression $w/\mu D_o$ is less than 1020 the following equation is to be used:

$$h_f = 0.943 \left(\frac{\rho^2 k^3 g}{L \mu \Delta t}\right)^{1/4}$$

PHYSICAL CONSTANTS: See Chemical Engineers' Handbook - J. H. Perry (1948).

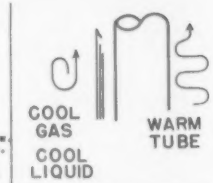
for ρ -- see pp. 130-148, 175-191, 1582.
μ -- see pp. 370-374, 1198, 1696.
k -- see pp. 459-461, 1303, 1697.
λ -- see pp. 210-216, 299, 249-261, 1685.

REFERENCES:

1. Applied Heat Transmission, 1st. Ed., H. J. Stoever, 76 (1941).
2. Chemical Engineers' Handbook, 2nd Ed., pp. 478 (1948) by J. H. Perry.
3. Heat Transmission, McAdams, 270.

G 3

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a WARM TUBE and COOL GAS OR LIQUID



Tube Position: Vertical

Fluid Movement: Natural Convection. Streamline Flow. Turbulent Flow.

Direction of Movement: Parallel to tube.

Data relating to the heating of a gas or liquid on the outside surface of a vertical tube in those cases in which the liquid is flowing parallel to the length of the tube are very meager. Two situations actually prevail, one in which the tube stands as a column in the bulk fluid and one in which the tube is surrounded by a second tube of larger diameter to give an annulus through which the fluid may be circulated.

In the first case equations of the type used for a vertical plane are suggested as being satisfactory, (see sections A 4 and 5).

For situations of the second type, equations appropriate for the estimation of the film coefficients in the inside of a pipe are, with a slight modification, probably suitable (see sections E 4 and 5). This modification is as follows:

The term D, the diameter of the tube, must be replaced by the term D_e, or equivalent diameter. D_e is obtained by application of the following equation:

$$D_e = \frac{D_2^2 - D_1^2}{D_1}$$

In order to test the conditions of flow, the Reynold's number should be calculated using an equivalent diameter D_e' with $D_e' = D_2 - D_1$.

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- D_2 - Diameter of inside surface of outside pipe, ft.
- D_e - Equivalent diameter for heat transfer, ft.
- D_e' - Equivalent diameter for flow calculations, ft.
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Δt_s = temp. surf. - temp. gas, °F.

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1. Mechanical Engineers' Handbook, Lionel S. Marks, Fourth Edition, p. 401.
2. Heat Transmission, William H. McAdams, p. 248.
3. Chemical Engineers' Handbook, J. H. Perry, p. 474.

G 4 and 5

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OIL AND GAS EQUIPMENT Digest

IT'S NEW — CHECK IT

TRADE LITERATURE

1 PACKAGE BUYING OF WELDING ACCESSORIES. In addition to illustrating a complete line of welding accessories, the catalog explains the package-buying method by which speedy shipment is made from stock on the same day orders are received. *A. O. Smith Corp.*

2 VINYLITE RESINS VMCH FOR COATINGS. The latest technical information of specifications, formulations, and uses of Vinylite Resin VMCH as a surface coating is presented in a new 16-page booklet, Technical Release No. 12. Addition of plasticizers, stabilizers, and solvents and their effects on resin VMCH are also discussed. *Bakelite Co., Division of Union Carbide & Carbon Corp.*

3 END DIRT AND MOISTURE PROBLEMS THE Hi-eF-WAY, a new eight-page folder, describes uses of purifiers (mechanical separators) to aid engineers, production executives, and maintenance personnel in cleaning up moisture, mist, dirt particles, guck and other entrainment in pipe lines and equipment. Cutaway views showing installation of purifiers in 14 different applications are accompanied by a brief description highlighting the purpose of the purifiers in each case. *The V. D. Anderson Co.*

4 BOOST PUMP POWER PACKAGE. Bulletin No. 500 gives complete details on S-440 series of air-operated hydraulic boost pump portable packages. Air at 100 psi. is boosted to hydraulic pressures as high as 30,000 psi., and used for sanded-up pump barrels, core ejection, static testing pipe and christmas trees, and related high-pressure static testing. *Sprague Engineering & Sales Corp.*

5 YORKMESH DEMISTER. This new illustrated 12-page catalog describes strong, flexible construction and operation of Yorkmesh demisters which can be easily installed in existing or new process equipment to eliminate entrainment losses, improve product quality or make possible increased throughput rates. A large portion of the catalog is devoted to summaries of typical applications, particularly in vacuum towers. Description of operation and complete engineering data are included. *Otto H. York Co., Inc.*

6 BOILER CONTROL. Bulletin 1007 illustrates and describes new Copes-Vulcan boiler control with instrumentation by Taylor. It includes data on combustion, feed water, boiler steam temperature, and soot blower controls, as well as standard or miniature instruments and conventional, console, or graphic panels. *Copes-Vulcan Division, Continental Foundry & Machine Co.*

7 PERMEABILITY METER SURVEY, a multicolored bulletin, describes a reliable and accurate method for metering the flow of fluids in a well bore when tubing is not present. Permeability meter is also described as an excellent tool for locating casing leaks and for testing cement jobs. *The Chemical Process Co.*

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OIL AND GAS EQUIPMENT Digest from QUICK IT

8 **TANK SHUTOFF CONTROL** is the subject of a new folder issued by Beaumont Iron Works Co., which describes control operation. Special features of the tank shutoff are fully illustrated. *Beaumont Iron Works Co.*

9 **HEAT PROCESSING BATCH LIQUIDS WITH DURADIANT CLUSTERS.** Radiant gas heat for processing liquids is the subject of this new bulletin which describes characteristics of combustion equipment and its applications to a wide variety of liquids requiring heat processing. Two types of burner settings, enclosed and open, are described, together with typical installations. *Selas Corp. of America.*

10 **NEEDLE VALVES.** Specifications and dimensions of new gland-type needle valves are graphically described in a new, two-color illustrated circular. These precision needle valves are especially applicable to instrument lines, orifice meters, gages, bypasses, and fine regulation of gases and liquids. *The Lunkenheimer Co.*

11 **SERVING CANADA'S OIL AND GAS INDUSTRY.** This colorful 20-page illustrated booklet contains information about the services offered by The Royal Bank of Canada to the oil and gas industry. Booklet particularly describes an exclusive bulletin service designed to provide oil and gas men with accurate, up-to-the-minute information on all important aspects of the industry. *The Royal Bank of Canada.*

12 **INSULATION SPECIFICATIONS FOR OIL REFINERIES AND CHEMICAL PROCESS PLANTS,** a 50-page book contains sections devoted to outline of specifications and recommendations for their use, general provisions for contract applications, insulation for temperatures above and below approximately 100° F., tank and oil heater insulation, and insulation - thickness recommendations. The book is illustrated throughout with application photographs. *Johns-Manville.*

13 **LOADING ASSEMBLIES.** This 24-page illustrated catalog is packed with information, specifications, and application data on loading and unloading assemblies for tank cars and trucks. Spring balanced assemblies, counter-balanced loading assemblies, balanced pressure loading valves, and loading nozzles are some of the items detailed along with pertinent engineering data. *OPW Corp.*

14 **SPANGWELD AND SPANG DOUBLE SEAL SHRINK THREAD DRILL PIPE AND TOOL JOINTS** are presented in a new 24-page, 4-color booklet. It outlines principal problems of drill-pipe use, steps taken toward their solution by development of these two types of drill pipe, and illustrates significant manufacturing operations that contribute to long life. Four pages of tables give specifications of available types and sizes of drill pipe and tool joints. *Spang - Chalfant Div., The National Supply Co.*

15 **HEAVY-DUTY ROTARY PUMPS.** Bulletin W-483-B2 covers both herringbone-gear type, with capacities to 5,000 g.p.m., and the sliding-vane type, with capacities to 1,000 g.p.m. Bulletin is complete with fields of application, coverage charts, mountings, and dimensions. *Worthington Corp.*

16 **CUSHIONED VALVES,** a new eight-page bulletin, describes cushioned automatic water and steam valves. Featured are float, altitude, and check valves, solenoid-operated valves, reducing, relief, and nonreturn valves. *Golden Anderson Valve Specialty Co.*

17 **HOUSING THE OIL WORKERS** is a reprint from the July issue of National Real Estate and Building Journal. The article covers both camp layout and individual housing plans to suit most oil-field needs. *Whitmor Homebuilders, Inc.*

18 **WELDED TANK CARS.** Engineering drawings show construction details of tank cars for crude, fuel and lubricating oils, and all other standard types for petroleum products, including propane and natural gasoline. Another section of the book illustrates step-by-step fabricating procedures in the production of tank cars. *American Car & Foundry Co.*

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OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by Dan B. Miller

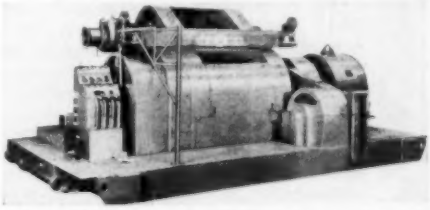
19 NEW SAFETY-TANK-CAR PLATFORM eliminates the dangerous hazard of a man standing and working on the curved slippery top of railroad tank cars during loading and unloading operations. It is supported on a steel column which is bolted upright to a concrete base beside the railroad tracks. From the grated deck of the platform the operator can turn the platform 360° stopping at any angle over the top of the tank car, or he can service two tank cars, one on each set of tracks on each side of the platform. When the platform is in position over the top of the tank car the operator can open the top, insert the unloading pipe, couple it up without stepping on top of the tank car. The platform is carefully balanced and rides on roller bearings so it is easily turned by the hand crank wheel. In order to turn the platform the operator must hold down a foot brake to release turning gears. When not in use a bolt lock holds the platform parallel to the tracks. Liquid-tight swivel joints, quick-disconnect couplings, and variable position of the platform make it possible to service cars not correctly spotted. The platform piping leads down through the supporting column. *Nichols Engineering Co.*

IT'S NEW CHECK IT

20 SINGLE TONE SELECTIVE SIGNALING SYSTEM. The system has been designed for use in conjunction with any communication medium; two-way radio, land lines, microwave, or power-line carrier, anywhere that remote control or receiver selection is a necessity. Function of the system is to allow any operator to initiate an operation at one or more remote points through an intervening communication medium. The operation may be the selection of a particular receiver or group of receivers from many receivers in a system, the selection of a particular relay transmitter, the illumination of a particular lamp on an indicator panel, the sounding of a particular alarm, or any operation that can be remotely controlled by a relay. There are four basic component systems: the 10-button selector box, the single-tone oscillator, the three-frequency switch kit, and the single-tone decoder. The 10-button selector box, ordinarily used at a fixed station, contains an oscillator and 10 tuned circuits. Each button on the selector is associated with a different tuned circuit, and, when depressed, connects the circuit to the oscillator, causing a fixed frequency tone to be generated. The tone is transmitted, picked up by the system receivers, and applied to decoders. In each sympathetically tuned decoder, a relay operates to initiate the desired functions. *Motorola, Inc.*

IT'S NEW CHECK IT

21 IDEAL TYPE 80-B RIG rated at 800 hp. input incorporates all the features of the popular type 80 rig, plus certain improvements. The new rig will normally be considered for drilling in the 6,500 to 10,000-ft. depth range. The rig is of sectionalized construction featuring a long spooling drum of optimum proportion and maximum accessibility. One of the principal improvements is the use of integrally mounted Ideal catheads, both makeup and breakout. These are of the friction-clutch type, air operated, with air actuation and self-contained within each. Modulating air valves permit driller, with precise control, to exert pulls on tonging or spinning lines in any degree. A second principal improvement is the addition of a third



The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

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chain drive in the transmission, thus providing six speeds to the drum shaft, making the draw works suitable for use with torque-converter-equipped engines, Gyrol drive groups, or a standard mechanical drive. The 25 by 49-in. drum is capable of handling 90-ft. stands of drill pipe with normal 8-line reeving and without spooling more than three full layers of line on the drum. It will usually be grooved for 1¼-in. line, but can be grooved for 1⅜-in. line or furnished plain if specified. Dy-A-Flex air clutches are employed for both the high and low drum drives. A 32-in.-diameter clutch, 10 in. wide, is used on the high drive and a 40-in. diameter clutch, 10 in. wide, on the low drive. Type K-46 compound equalizing drum brakes are standard equipment. A Hydromatic or Dynamatic auxiliary brake is provided optionally. *The National Supply Co.*

IT'S NEW CHECK IT

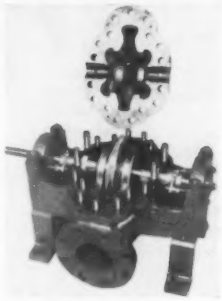
22 A NEW PACKER, the PS-3 is a sister packer of Brown Duo-Pak. With exception of a top sealing cup, the PS-3 is identical to the Duo-Pak. On shallow wells where most of the tubing weight is to be placed on the packer, the upper cup is not needed. The PS-3 can also be used to advantage when a large differential is present from below. Like the Duo-Pak the PS-3 is easy to run because of the large bypass ports which prevent piston action. It is easy to set without left-hand rotation and easy to retrieve without rotation. All working parts are enclosed and are not affected by debris or corrosive fluids and gases. *Brown Oil Tools.*

IT'S NEW CHECK IT

23 MODEL MP MULTI-PROBE ULTRA-VISCOSON SYSTEM is designed for continuous, automatic viscosity measurement to 650° F. and 1,000-psi. pressure at up to 16 probe stations. Hermetically sealed ultrasonic probes the size of a fountain pen, having no moving parts, are installed permanently in up to 16 kettles or pipe lines. One Ultra-Viscoson computer and multiplex unit located up to 1 mile from probes indicates viscosity measured by any desired probe, or automatically records viscosities singly or in sequence on standard multipoint industrial recorders. Up to 16 kettles, reactors, or pipe lines are monitored automatically in production and application of petroleum products. *The Ultra-Viscoson Corp.*

IT'S NEW CHECK IT

24 NEW CENTRIFUGAL PUMP SERIES. Standard features on the series include renewable stuffing-box bushings, sealed bearing housings, cowl-type glands suitable for use with quenching liquids, stainless-steel impeller keys, Teflon water seal rings, die-formed stuffing-box packing, and corrosion-resistant gland bolts. Bearing spans have been kept to the shortest practical distance. There are three different assemblies of shafts and rotating parts. Wide interchangeability of parts in each assembly makes it possible to provide 19 different pump sizes in the three groups.



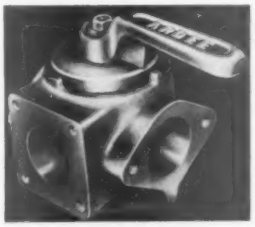
In addition, the locking design of shaft sleeves makes it possible to change the direction of impeller rotation easily in the field without additional parts. Thus, 38 different pump combinations are offered in the new series. The pumps can be supplied with electric motor, belt, or steam-turbine drives. The impeller is of the double-suction type providing hydraulic balance. All mounting dimensions of all pumps within each group are identical, giving wide ranges of interchangeability in the field should new requirements be met. In addition, motor-drive bed plates are standardized, with all bed plates being jig-drilled and tapped to accommodate all motor frames within the scope of the bed plate. *Goulds Pumps, Inc.*

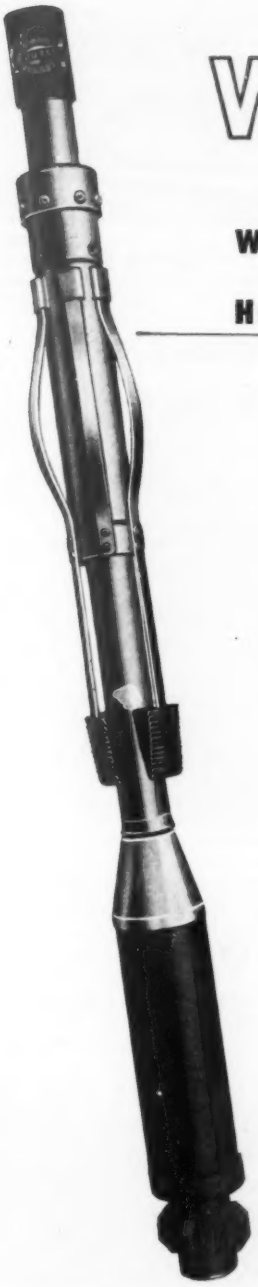
IT'S NEW CHECK IT

25 TIPTON'S NEW VENT BONNET. Offering a much greater safety margin, the vent bonnet protects men while using hand and air tools in pipe-line-repair operations. The vent bonnet can be clamped on the pipe line at the desired location, as soon as excavation of the bell hole is below the bottom of the pipe line, thus speeding up preparation of the excavation and pipe for application of a high-pressure pipeline patch. Oil or gas is vented away through the 1-in. vent line. When the chain is tightened around the pipe a rubber gasket is compressed around the leaking area. The vent bonnet fits all sizes of pipe from 16 to 36-in. *J. J. Tipton.*

IT'S NEW CHECK IT

26 NEW RECIRCULATING VALVE. A unique recirculating valve that may be used for any stream dividing application of gases, air, salt water, oil, or mild chemicals to 125 psi. incorporates a combination of proved plug-valve principles and O-ring scaling. Positive leakproof condition is obtained and handle loads and internal wear are reduced to a minimum by the use of an externally adjustable spring seating control, featuring multiple ball pressure contact against a hardened wear ring. Valve is available in cast aluminum, steel, or Navy bronze. Bronze and steel valves are cadmium plated throughout. Flange connections are available for





Type "WF" Hold Down Packer with Automatic Latch

WATERFLOOD

WITH GUIBERSON'S *type* 'WF'

HOLD DOWN PACKER WITH AUTOMATIC LATCH

The Type "WF" hold down packer is a low cost tension packer designed especially for water-flooding, salt water disposal and similar projects. It may also be used for injecting fluids under moderate pressures into the formation below the packer and for other operations requiring tubing pressure in excess of pressure in the annulus.

The packing element on the "WF" is a long sleeve type with sixteen inches of exposed soft rubber that will effectively seal even a rough and pitted casing wall. It will not vulcanize to the casing. Design and construction is such that the same packer will pack-off in a wide range of casing weights; an advantage which, coupled with low initial cost, makes this packer an exceedingly economical investment.

The "WF" has the easy-run, easy-set, easy-pull characteristics of all Guiberson packers. Ample fluid by-pass eliminates down swabbing and assures easy run-in without the use of a valve. Friction springs provide necessary back-ups for the latch mechanism which features an all-metal latching dog with corrosion-resistant coil springs. An anti-lock device assures dependable latch release. Downward movement of tubing in relatch operation automatically latches slips out of engagement with head, freeing packer immediately for removal or resetting. For positive pack-off at lowest cost, use the "WF" in any recommended application.

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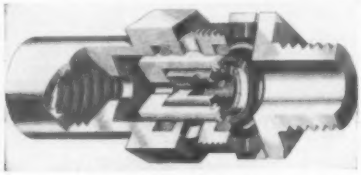
either male or female thread adaptation. *Ardee Manufacturing Co.*

IT'S NEW CHECK IT

27 CHEMICAL INJECTOR WITH PRESSURE TANK. A new series of chemical injectors with welded steel pressure tanks are available for use with viscous or volatile liquids. The tank permits chemicals or additives to be forced from the container to the injector heads under contant pressure, to assure proper loading of the suction and to prevent volatilization and waste of alcohols and similar fluids. The tanks are designed for pressures up to 50 psi. and are furnished with a safety valve and a bleed valve. The same gas or air pressure that operates the injector proper is used to hold pressure in the tank. The new units are available with single or double tanks, for use with single or double injector heads. *Texsteam Corp.*

IT'S NEW CHECK IT

28 NEW CHATTERPROOF QUICK-RELEASE VALVE. Designed to handle air pressure from 0 to 250 psi. on pneumatic clutches up to 1,500 hp., the valve is said to introduce innovations in design and performance. Features include light weight and a compactness which permits its use on rotating elements without disturbing dynamic balance; a built-in orifice which prevents accidental removal of orifice from the line and eliminates possibility of pressure equalization responsible for chatter; and double-piston design for smooth, positive, quick-releasing action. *Deublin Co.*

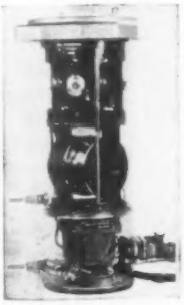


IT'S NEW CHECK IT

29 NEW MODEL D35 BONANZA continues to feature its cruising speed of 175 m.p.h. at 8,000 ft., the recommended economy-cruise speed which can be obtained at 120 hp. the use of only 65 per cent of the engine's power, thus offering fuel economy of only 10 gal. per hour. It has a maximum range of 1,180 miles with auxiliary fuel of 20 gal.; a fuel economy, at maximum range, of 19.9 miles per gallon; tricycle landing gear, with hydraulic shock-absorber struts; a takeoff run of 525 ft. (20° flaps, sea level, 10-m.p.h. wind); a landing run of 227 ft. (30° flaps, sea level, 10-m.p.h. wind); a top speed of 190 m.p.h. and excellent visibility through large windshield and four large windows. Among the new improvements are improved cabin ventilation; low noise-level; reclining three-position front seats; special eye-ease tinted windows; two new functional position controls on the instrument panel permitting the pilot to feel for a flap or for a landing-gear wheel. *Beech Aircraft Corp.*

IT'S NEW CHECK IT

30 PRESS-I-CELL. The new instrument can measure pressure with an accuracy of one part in 5,000, and has a sensitivity of one part in 15,000. Despite this extreme accuracy and sensitivity, the meter is compact, portable, temperature-stable, and unaffected by vibration or mounting position. Also noteworthy is the 600-in. scale which was developed to take full advantage of the accuracy of the instrument's pressure-sensing element. An easily-read interval of 1/16 in. on the scale represents 1/10,000 of the full pressure range. The instruments can be equipped to operate over a wide range of absolute or gage pressures or differentials. Typical pressure ranges are 1 atmosphere absolute, 400-in. water column, and 150-in. Hg differential. Either of two models is available: manual, in which the proper scale position is found by manual setting; and automatic, in which the scale is correctly positioned by a servomotor. In the automatic instrument, the correct reading is obtained with no hunting or oscillation of the scale. Repeatability is rated at one part in 7,000. *Fischer & Porter Co.*



IT'S NEW CHECK IT

31 INTERNATIONAL MODEL R-110, 115-IN. WHEELBASE TRUCK with 6½-ft. all-steel pickup body, is one of 168 basic truck chassis models in 296 wheelbases introduced with International Harvester Co.'s new R-line. Nine new pickup models, featuring 6½, 8, and 9-ft. all-steel bodies, are available in the R-110, R-120, and R-130 series. Gross vehicle weight ratings range from 4,200 to 8,600 lb. Three wheelbases and a variety of axle ratios and transmissions are offered. This and International's other new light-duty models are powered by the 100-hp. valve-in-head Silver Diamond 220 engine. The line offers 307 new features developed at International's engineering and test laboratories. *International Harvester Co.*

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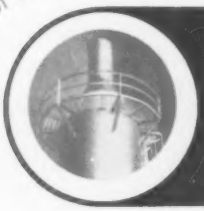

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REFINING

Pan American's Texas City Refinery to Be Enlarged

TEXAS CITY, Tex.—Pan American Refining Corp. has scheduled construction at its refinery here to step up operations all along the line.

Current crude-oil capacity of the plant will be increased 3,000 bbl. daily to a new total of 153,000 bbl. daily.

Catalytic cracking facilities are to go up from the current 38,000 bbl. daily to 68,000 bbl. daily. Capacity of the catalytic polymerization plant will be increased by 2,400 bbl. daily, and alkylation capacity also will be boosted by 2,400 bbl. daily.

Pure Oil to Place New Cat On Stream Soon at Toledo

TOLEDO.—A new 11,600-bbl. per day fluid-type catalytic cracker is scheduled to go on stream soon at Pure Oil Co.'s refinery here.

A new catalytic polymerization plant rated at 1,270 bbl. daily will be placed in operation at about the same time.

Capacity increases were not made on any of the refinery's major plants. The plant has a crude-oil rating of 29,400 bbl. daily and is equipped with thermal operations including a 175-ton per day coker and a 5,000-bbl. fixed-bed catalytic reformer.

Premier Schedules Extensive Construction at Fort Worth

FORT WORTH.—Premier Petroleum Co. has scheduled an extensive expansion program for its refinery here.

Major units included in the project are catalytic cracking, gas recovery, and catalytic polymerization. Current plans do not contemplate increasing the plant's crude-oil distillation capacity.

Premier currently is installing a 90-bbl. catalytic polymerization plant at its Longview, Tex., refinery. Crude-oil rating of this plant is 4,200 bbl. daily.

Lion Nearing Completion of El Dorado Plant Expansion

EL DORADO, Ark.—Lion Oil Co.'s expansion project at its refinery here now is well towards completion.

The 10,000-bbl. per day fluid-type catalytic cracker now under construction will give the refinery a total cat cracking capacity of 16,000 bbl. daily. The refinery's existing cat cracker is a 6,000-bbl. per day Thermofor unit.

Crude-oil capacity of the El Dorado plant is scheduled to be increased from 22,000 bbl. per day to 23,500 bbl. per day this year. The refinery is equipped to produce 1,000 bbl. per day of lube oils and around 210,000 tons annually of asphalts plus various other products.

Included in the current modernization and expansion project is a 1,150-bbl. sulfuric acid alkylation unit.

Socony-Vacuum Lets Contract For New Thermofor Cracker

NEW YORK.—Lummus Co., New York, has been awarded the contract for construction of a 15,000-bbl. per day air-lift Thermofor catalytic cracking unit at Socony-Vacuum Oil Co.'s East St. Louis refinery.

The new unit will replace an existing 10,000-bbl. per day Houdry unit. The modernization program also will include installation of new feed preparation and fractionation facilities.

The gas-recovery plant will be revamped and a new catalytic polymerization unit will be added. Field work will commence this spring, and initial operation of the new facilities is scheduled for early 1954.

Midland Co-Op to Complete Cushing Expansion June 1

CUSHING, Okla. — Revamping of Midland Cooperative Wholesale's refinery here is scheduled for completion by June 1.

Crude-oil capacity of the refinery is being increased 70 per cent to 10,500 bbl. daily along with a 700 per cent increase in catalytic polymerization capacity.

The refinery also is being equipped with a 5,000-bbl. per day fluid-type cat cracker. Feed for the new cracker will be supplied via a converted thermal unit previously rated at 1,800 bbl. per day.

Contract for erection of the cat cracker and poly unit and for the feed-preparation unit along with some of the auxiliaries is with Refinery Engineering Co., Tulsa.

Capacity of Phillipsburg, Kans., Plant to Be Doubled

PHILLIPSBURG, Kans.—Cooperative Refinery Association's plant here

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is scheduled to be doubled this year.

With the new facilities in service, the refinery will have a crude-oil rating of 8,000 bbl. per stream day. In addition to this increase, the refinery is to be equipped with catalytic cracking and polymerization facilities. It will also have a new 3,500-bbl. per day vacuum unit.

The over-all project at Phillipsburg will give the refinery a modern processing layout. To balance out operations, the fluid-type cat cracker has a rating of 4,500 bbl. daily with cat poly capacities set at 300 bbl. per day.

Refining Briefs

New asphalt facilities are being installed in the Long Beach, Calif., refinery of Envoy Petroleum Co. The new equipment has a capacity of 700 bbl. per day of oxidized products. Envoy's refinery currently is rated at 5,000 bbl. per day when processing light crude oil and 3,000 bbl. per day when running asphalt.

Pure Oil Co. has awarded a contract to Catalytic Construction Co. of Philadelphia, for the construction of additional boiler-house facilities and auxiliaries at Pure's Toledo refinery. The construction company is now installing new catalytic cracking facilities and new copper oxide naphtha treating units at Toledo, with completion scheduled for July of this year.

Petroleum Specialties, Inc., is adding a 2,500-bbl. per day visbreaker to its facilities at Flat Rock, Mich. The new unit is scheduled to go on stream later this year. Currently the refinery has a crude-oil rating of 6,000 bbl. per day and operates a 1,500-bbl. per day Platformer, which was placed in service less than a year ago.

Facilities of Crystal Refining Co. of Carson City, Inc., soon will include a new TEL blending plant. Capacity of the blending plant permits production of standard and premium-grade gasolines for the total output of the 6,200-bbl. per day crude-oil-topping refinery at Carson City, Mich.

Three major expansion projects currently are under way at the East Chicago, Ind., refinery of Cities Service Oil Co. (Del.). First of these is a new crude unit which will hike the refinery's capacity from 40,000 to 52,000 bbl. per day. The other new units are a delayed coker and a Hydroformer. Capacity of the coker is 380 tons daily. Charge rating on the new fluid-type Hydroformer is 12,500 bbl. per stream day.

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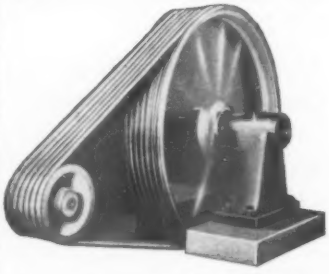

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PIPE LINES

Last-Half Survey

FPC says 2,232 miles of natural-gas lines approved

WASHINGTON. — Construction of 47,994 miles of natural-gas pipeline facilities with 3,439,058 compressor horsepower at an estimated cost of $3,337,159,463 has been authorized by the Federal Power Commission in the 11 years since it was given jurisdiction over such matters on February 7, 1942.

A total of 4,147 miles of pipe lines and installations of compressor units aggregating 588,095 hp. at an estimated cost of $409,476,207 was authorized during 1952. Statistics just compiled by the FPC for the last half of the year show that 2,232 miles of line and 139,205 compressor horsepower to cost $174,055,234 were authorized in that period.

Although the commission began the issuance of certificates of necessity early in 1942, the big drive in natural-gas expansion did not start until the middle of 1943, only five certificates providing for 71 miles of line being issued up to June 30, 1943. The facilities authorized since 1942 have provided a daily delivery capacity of more than 18,000,000 M.c.f. of natural gas.

Last half . . . Reviewing its activities during the last half of 1952 the commission reported that 23 of the 84 certificates issued were for major projects costing $700,000 or more and involving construction of 2,078 miles of line and 117,360 compressor horsepower to cost $164,293,258.

The 84 projects had an aggregate daily delivery capacity of more than 1,250,000 M.c.f.

Biggest project . . . The largest authorization issued during the 6-month period was for construction by Texas Gas Transmission Corp., of Owensboro, Ky., of 408 miles of 26-in. loop line in segments on its main-line system between Louisiana and Kentucky and 26,860 hp. in new and existing main-line compressor stations in Louisiana, Tennessee, Indiana, and Kentucky at an estimated cost of $33,752,705, to increase the company's delivery capacity by 295,000 M.c.f. daily.

Northeastern Penetration

This 8-in. submarine crossing of the Annisquam River near Gloucester, Mass., is part of a 3½-mile natural-gas line from a metering station of Northeastern Gas Transmission Co. to Gloucester. So far, this is the deepest penetration of natural gas into the Northeast. The line, crossing, and gas-gathering plant were built recently for Gloucester Gas Light Co. by United Engineers & Constructors, Inc., Philadelphia. Joints of pipe were welded into sections ashore, and the sections then welded together as the line was pulled across the 1,500-ft.-wide river from the opposite bank. Marshy approaches and quicksand bottom at the crossing forced use of fill on the right-of-way ashore. Field work was subcontracted to Merritt-Chapman & Scott Corp.

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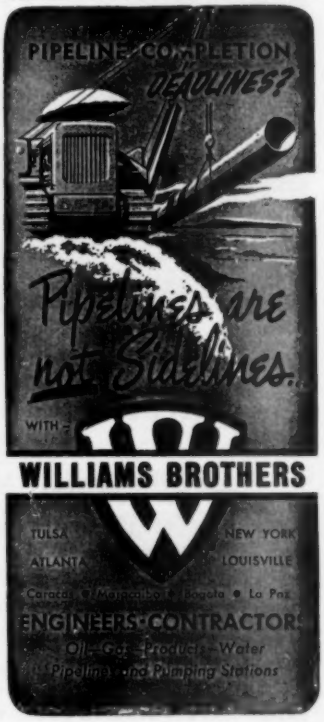

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Pasotex Completes Doubling Of Wink-El Paso System

EL PASO, Tex.—Pasotex Pipe Line Co. has completed a 200-mile, 8-in. crude oil line from Wink to El Paso, Tex., according to M. J. Paret, Jr., vice president.

Laying of the line was contracted by McVean & Roberts. The new line parallels a previous 200-mile, 8-in. line.

In connection with the expansion work, the pump stations have been revamped in such a way that the previous eight stations have been reduced to four, where the 1,200 hp. in diesel reciprocating pumping units is now concentrated. No new pumping units have been added.

Capacity of the system has been raised from 28,000-30,000 bbl. per day to a new total of 45,000 bbl. per day.

P. G. & E. Starts Construction Of 86 Miles of Gas Loops

SAN FRANCISCO.—Pacific Gas & Electric Co. has begun construction work on four loops totaling 86 miles on its big-inch gas line from a connection with El Paso Natural Gas Co. on the California-Arizona border near Topock, Ariz., to Milpitas, Calif.

The project is part of a two-fold plan to increase capacity of the P. G. & E. line to 700,000,000 cu. ft. from the present 400,000,000 cu. ft. per day.

First looping work is being done at Newberry, 31 miles east of Hinckley compressor station in the Mojave Desert. The 86 miles of loop will be completed next winter.

An application to lay another 170 miles of 34-in. loops is now before the Federal Power Commission. This, together with the installation of 15,000 hp. in compressor capacity, would increase capacity of the line by 151,730,000 cu. ft. daily. The company also plans to lay 8 miles of line between Milpitas and Irvington, Calif. Estimated cost of the second phase of the project, which would be completed early in 1954, is $26,981,851.

Platte Buys 91-Mile Crude Line From Wind River Basin

KANSAS CITY, Mo.—Platte Pipe Line Co. has announced the purchase from Service Pipe Line Co. of one of the latter's two 8-in. crude lines from the Wind River basin area of Wyoming.

Crude will be delivered through the 91-mile line to Platte's pump station at Lost Cabin, Wyo., from Maverick Springs, Pilot Butte, and Steamboat Butte.

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Tariffs have been published and became effective February 3. According to Millard K. Neptune, president of Platte, the Interstate Commerce Commission has issued a special order permitting the issuance on 1 day's notice rather than the customary 30 days' notice.

Bell Oil Purchases Service Gathering System in Texas

TULSA.—Bell Oil & Gas Co. has purchased a 96-mile crude-oil gathering system in Kadane and Kamey field of Archer and Wichita counties, Texas, from Service Pipe Line Co., Tulsa.

The system originates in Archer County, runs northeast to Burkburnett, and there connects with Bell's main line running to the Bell refinery at Grandfield, Okla.

Included in the purchase is an 8-in. trunk extending north from Burkburnett across the Red River to Devol, Okla., and then east to the Cache Creek field in Cotton County, Oklahoma, where it connects with Service's main line running east. All pump stations, an 80,000-bbl. tank and a 55,000-bbl. tank also were sold.

The crude gathered by the system will continue to be carried to Bell's refinery at Grandfield. The company formerly purchased the oil from Stanolind Oil & Gas Co.

Southern California Firms Plan Big Looping Program

WASHINGTON.—Southern California Gas Co. and Southern Counties Gas Co. of California, Los Angeles, have filed for Federal Power Commission authorization to lay 73 miles of 30-in. main-line loops and to install 5,280 hp. in additional compressor capacity along their existing line from Blythe, Calif., to a point near Santa Fe Springs.

The new construction would increase capacity of the line by 151,700,000 cu. ft. daily at an estimated cost of $7,482,194.

Pure Receiving Pipe

KIMBALL, Neb.—Pure Transportation Co. a subsidiary of Pure Oil Co., is receiving pipe for its 45-mile, 8-in. crude line from Kimball to Gurley, Neb.

The line will gather crude from South Kimball, Enders, Goodwin, Southwest Potter, and other pools in the Kimball area and carry it to a connection at Gurley with the Platte crude line, in which Pure Oil is a shipper and shareholder. Capacity of the line is estimated at 25,000 bbl. daily.

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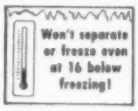

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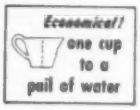

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NATURAL GAS

Gas to Northwest

FPC resumes hearings to decide who'll build line

WASHINGTON.—What promises to be one of the most hotly contested hearings ever held by the Federal Power Commission gets under way this week as that body attemps to reach a decision as to which of five firms should serve the Pacific Northwest with natural gas.

The five companies are Northwest Natural Gas Co., New York; Pacific Northwest Pipeline Corp., Houston; Westcoast Transmission Co., Inc., Wilmington, Del.; Glacier Gas Co., Butte, Mont.; and Trans-Northwest Gas, Inc., Spokane.

Four of the applications to serve the area propose importing gas from Canada. The fifth, Pacific Northwest Pipeline, would lay a line from the San Juan basin of New Mexico and Colorado. Still another company, Northern Natural Gas Co., is seeking to lay a line from Pincher Creek gas field in Alberta to markets in the northern portion of the U. S. Midwest.

Two favored . . . Industry observers think that the franchise to lay a pipe line to the Washington-Oregon-Idaho area will go either to Westcoast Transmission Co. or to Pacific Northwest Pipeline. This is because these two companies are the only ones with available reserves adequate to justify construction of a line. Pacific Northwest now has reserves, as estimated by DeGolyer & MacNaughton, consulting geologists, of 3 trillion cubic feet. Westcoast Transmission has in excess of 2 trillion cubic feet in the Peace River area of Alberta and in British Columbia. Export of gas by the company has been approved by Alberta and Canadian governmental agencies.

Up to now, none of the other firms which base their applications on Canadian sources of supply (all in Alberta) has obtained Canadian government permission to export.

Lone Star Plans Expansion Outlay of $28,038,000

DALLAS.—Lone Star Gas Co. will spend $28,038,000 this year for expansion and additions to its physical properties, according to D. A. Hulcy, president.

Expenditures will go toward additional gathering and transmission pipe lines, construction and enlargement of gasoline and compressor station facilities, drilling of oil and gas wells and acquiring of leases, transportation and construction equipment, new office and warehouse buildings, and extensions to present local distribution systems.

More than $11,000,000 has been dedicated for construction of transmission facilities, and about $7,000,000 will go for acquisition of leases and drilling of wells, the latter to be handled by Lone Star Producing Co., wholly owned subsidiary.

Lone Star was delivering gas at the end of the year at a rate of 175,000,000,000 cu. ft. a year. Expansion to 191,000,000,000 cu. ft. is contemplated during 1953.

Pacific Northwest Offers To Buy Rangely Field Gas

DENVER.—Pacific Northwest Pipe Line Co., Houston, has offered to buy up to 35,000,000 cu. ft. of gas daily from the principal operators in Colorado's Rangely oil field.

The gas would be gathered and piped through Pacific's proposed 1,466-mile, $186,000,000 natural-gas trunk line from the San Juan basin to the Seattle-Tacoma area.

The offer came to public attention when it was introduced as evidence in a District Court test of state regulatory powers in the production of oil and gas.

Ohio Fuel to Convert Five Gas Pools to Storage Service

WASHINGTON. — Ohio Fuel Gas Co., Columbus, has been authorized by the Federal Power Commission to convert five natural-gas pools in Ohio to storage service and to lay about 35 miles of gas pipe lines to deliver about 50,000,000 cu. ft. of gas daily into one of the storage areas.

The company will convert one pool in Ashland and Richland counties to storage as part of its Weaver storage area. The other four pools, in Holmes, Wayne, and Ashland counties, will form a new storage area to be known as the Holmes storage area.

Ohio Fuel's proposal to convert a pool in Coshocton and Guernsey counties to storage service was rejected by FPC. This project, according to FPC, assumed a gas supply from Tennessee Gas Transmission Co. and would necessitate a connection with that company. The commission said Tennessee had not applied for authority to establish such a connection.

The 35 miles of new line will parallel sections of existing lines in Fairfield, Franklin, Delaware, and Licking counties to boost deliveries into the Holmes storage area by 50,000,000 cu. ft.

Ohio Fuel also was authorized to lay about 97 miles of lines to connect the new storage areas with transmission facilities and to build a 6,000-hp. compressor station in the Holmes area.

Total estimated cost of the facilities is $6,555,000.

New A. G. A. Meeting Set Up For Men on Operating Level

NEW YORK.—A new conference set up especially for operating and technical men engaged in the production, transmission, and storage of natural gas will be held by the American Gas Association this spring.

The conference will replace the A.G.A.'s natural gas spring meeting, aimed primarily for top executives.

The conference will be held April 30-May 1 at the Edgewater Beach Hotel, Chicago. Topics slated for discussion include compressor-station operations, pipe-line construction, maintenance, pipe-line cleaning, rights-of-way, legal statutes and lease forms for underground storage, communications systems, and problems of dispatching.

November Sales Up 10.6 Per Cent From 1951, FPC Says

WASHINGTON.—Gas sales of 87 natural-gas companies to ultimate consumers during November 1952 climbed to 220,414,000,00 cu. ft.—an increase of 10.6 per cent over November 1951, according to the Federal Power Commission.

Sales to industrial, commercial, and residential users increased 13.5 per cent, 2.9 per cent, and 5.4 per cent, respectively. Revenues from sales totaled $76,538,748.

Net income of the companies for November 1952 was up 8.5 per cent over November 1951, while net income for the 12 months ending November 1952 showed an increase of 5.3 per cent or from $192,690,495 to $202,877,546.

Increases in operating revenues, in gas utility operating income, and in net gas utility plant of the reporting companies were 15.9 per cent, 8.9 per cent, and 13.4 per cent higher, respectively. Gas operating revenue deductions showed an increase of 14.7 per cent.

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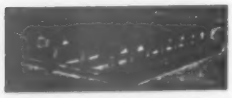

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Among the Drilling Contractors

Two New Drilling Firms Work in Tri-State Area

Two new names have been added to the list of rotary drilling contractors operating in the tri-state area of Illinois, Indiana, and western Kentucky. Hopkins Drilling Co., headquartering at Mount Vernon, Ill., has been organized by Dale Hopkins and his son, Kenneth W. It is starting with a 2,500-ft. rig. C. C. Beebe Drilling Co. has been formed by J. D. Turner and C. C. Beebe. Its main office is at Evansville, Ind.

Miracle-Fifer Running Two Rigs in Colorado

Miracle-Fifer Drilling Co., Denver, reports the operation of two U-15 rotary rigs in the Denver-Julesburg basin. Both currently are in Logan County, in northeastern Colorado.

One is on an extension well, north of the West Peetz field, in the northern part of the county, which this company drilled in partnership with Ryan Oil Co. The well, 1 Michaels, in the NE SE SW 31-12n-52w, is in process of completion with total depth at 5,331 ft.

The other rig is under contract to W. W. Harvey Drilling Co. and M. D. Scruggs for a rank wildcat test, 1 Haley-Smith, being started in the NW SW SW 7-11n-54w, in the extreme northwestern part of the county. Partners in the company are Walter W. Miracle and R. M. Fifer.

Valley Acquires New Rig

Valley Drilling Co., Evansville, Ind., has acquired a new Brewster N-4 rotary rig. This company is owned by Monroe Dyer and D. C. Thompson, Grayville, Ill., and W. H. Dickerson, Henderson, Ky.

Mercury Drilling Co., Tulsa, has taken on the contract for another deep test which Phillips Petroleum Co. has projected for the Oakman area, west of Royal, in Stephens County, Oklahoma. The new test, scheduled to go to 9,500 ft., is more than ½ mile west of Phillips' initial well, 1 Oakman, which found indications of production in Simpson sand at 7,462-72 ft., but which now is drilling ahead to the Arbuckle. The new operation will be 1-A Norman, in the SE NE SW 2-1n-4w. Phillips has another deep test drilling ½ mile south of the indicated discovery.

New California Company

Fred Johnson Drilling Co. is a newly formed California drilling contracting firm with headquarters at Long Beach. It is headed by C. F. Johnson. Associated with him are R. J. Osburn, T. M. Shallenberger, and K. R. Davis.

Columbia Drilling Co. Houston

COLUMBIA DRILLING CO., operating four heavy-duty rigs on the Texas Gulf Coast, cut 355,000 ft. of hole during the past year. Organized July 1, 1947, the company started with one rig working in the West Columbia field, Brazoria County. Its second rig was put in operation in April 1948; the third in March 1949, and the fourth in December 1950.

J. U. TEAGUE

Personnel: J. U. Teague, long prominent in Gulf Coast engineering circles, is president of the company. Prior to organization of this company, he was superintendent for the late Mike Hogg interests. Previously, he was chief petroleum engineer, Gulf Coast division, Humble Oil & Refining Co. He is a past president of the Gulf Coast chapter, American Association of Oilwell Drilling Contractors, and now is chairman of the association's committee on standardization of rotary drilling practices.

D. H. Smith is vice president, and J. H. Lester, secretary-treasurer. Tool

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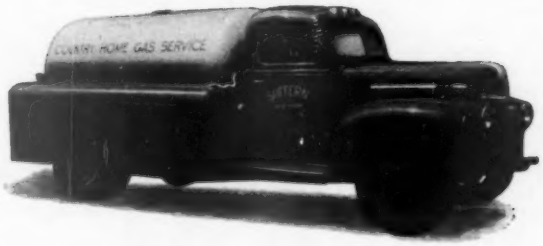

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Equipment. — The company's four rigs include one steam and three mechanically powered assemblies. One of the latter, now working for Shell Oil Co. in the East Village Mills field, in Hardin County, has a Model CT-5, 450-hp. draw works, powered by 2 NKU 225-hp. engines, and two mud pumps, one 7¼-in. by 14-in. and the other 7¼-in. by 12-in. It uses a conventional 127-ft. derrick on a 9-ft. substructure. A similar assembly is on a wildcat location being drilled for Falcon Seaboard Drilling Co. in the Spring area of Harris County.

The other power assembly, drilling for Humble Oil & Refining Co. in the Amelia field, Jefferson County, has a Model U-15, 600-hp. draw works with three 225-hp. engines, two 7¼-in. by 14-in. mud pumps, and a C-12, 7-in. by 12-in. mud pump. It also uses a conventional 127-ft. derrick on a 9-ft. substructure.

The steam rig, drilling for the company's own account in the South Cottonwood Creek field, DeWitt County, has a Model ECA draw works, driven by a 14-in. by 14-in. engine, and two pumps, one 16¼-in. by 8-in. by 20-in. and the other 15-in. by 7¾-in. by 18-in. It has a 950,000-lb., 136-ft. derrick on a 7-ft. substructure.

Commonwealth Drilling Co., Ltd., Calgary, Alta., contractor on Tide Water Associated Oil Co.'s recently completed oil-discovery well at Forget, in southeastern Saskatchewan Province, has moved its rig to another Tide Water wildcat location 20 miles to the northwest. The new test will be 2 Kenosee, with location in LSD 16, 23-10-4w2. It is 17 miles northwest of Carlyle, and 50 miles north of the border.

ACTIVE ROTARY RIGS*

(United States and Western Canada)

Area—	Week ended 2-9-53	Change week ended 2-2-53	Change week ended 2-11-52
Gulf Coast	614	− 2	+ 40
N. & W. Tex.-N. M.	817	+37	−235
Ark.-N. La.-E. Tex.	125	− 4	− 32
Oklahoma	320	+ 3	− 25
Kansas-S. Nebraska	183	+28	+ 28
Illinois-Eastern	109	+33	+ 38
Rocky Mountains	203	−12	+ 47
Pacific Coast	165	−10	− 5
Total U. S.	2,536	+73	−144
Western Canada	143	−19	− 31
Total	2,679	+54	−175

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Gulf Coast and Arkansas - North Louisiana - East Texas areas are shown on pages 218 and 219.

Mountain States Drilling Co., Denver, has contracted for a 7,000-ft. Fort Union test to be drilled for J. Ray McDermott in the Powder Wash area of Moffat County, northwestern Colorado. Location is on government land in the SW SW SE 26-12n-98w.

McAlester Fuel Co., Magnolia, Ark., has taken a contract for an 8,000-ft. Smackover test to be drilled for H. C. Spoor, Jr., of Houston at a wildcat location 1¾ miles southeast of the Magnolia townsite, in Columbia County, Arkansas. Location of the test, I Merritt and associates, in 20-17s-20w, is ½ mile west of the Magnolia field.

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Southernmost Province Being Tested

DOWN in Florida, just a few miles north of the southernmost point in the United States, there's a drilling wildcat scheduled to check 10,500 ft. of the area's dominantly calcareous section which has yielded one oil field and traces to sizable shows of oil in a few deep tests drilled in recent years.

The wildcat, Sinclair Oil & Gas Co. 1 H. R. Williams, 24-59s-40e, Monroe County, is about 40 miles south of Miami. The test is located on a block of 171,500 acres, part of which is on Key Largo, part in the shallow sounds and bays toward the mainland, and part on the ocean side of the big key. Excepting Sunniland, Florida's only oil field, Sinclair's wildcat is about 600 miles from the nearest production, which is in Escambia County, southwest Alabama.

Sinclair reports that it obtained one-half interest in the block late in 1952 from Commonwealth Oil Co., one of the considerations being the deep test which is now drilling below 3,172 ft.

The wildcat's projected depth should be sufficient to penetrate the only producing zone in Florida. This zone, the Lower Cretaceous - Glen Rose - Sunniland, is found at about 11,500 ft. at Humble Oil & Refining Co.'s Sunniland field. Due to a slightly gulfward tilt of the Cretaceous rocks from the "backbone" of Florida (the southward plunging extension of the Ocala uplift) Sinclair's well is expected to find the Sunniland zone 1,000 to 1,500 ft. higher than at Sunniland field.

Sunniland's 12 wells produced nearly 592,000 bbl. of oil last year to bring the 9-year-old field's cumulative production to 2,766,000 bbl. at the beginning of 1953. Production here is structurally trapped.

Florida has long been looked upon as a possible future province, but activity in the state has never been intense nor very long lived. Though exploratory drilling began shortly after the first of this century, it has been only in the past 10 years or so that scientifically located tests have been made.

That portion of Florida south of the

Ocala uplift, on which the Cretaceous section thins to about 1,500 ft., is known as the South Florida embayment of the Gulf of Mexico basin. This embayment is filled with southward thickening sedimentary rocks which reach a thickness of at least 15,000 ft. at the southwest tip of Florida. In contrast to the clastic facies typical of the Cretaceous rocks of the Florida Panhandle and on to the west in southern Alabama and Mississippi, the section is dominantly calcareous, consisting of limes, marls, and evaporites.

South Florida, though little known in detail because of the paucity of deep wells, cannot be overlooked as a future petroleum province. Both the Lower Cretaceous and Jurassic rocks exist in this area in the form of tremendous wedges which expand at the rate of 100 ft. per mile down the dip across the southern extension of the Ocala uplift.

Speaking of these wedges and those formed on to the west around the southwestern extension of Appalachian arch in Mississippi and Alabama, A. I. Levorsen, in his presidential address to the Geological Society of America, said, "No one can even guess in advance of drilling what structure, stratigraphic sequences, or changes in facies will occur in these rocks, but their past history in Louisiana and Arkansas gives some indication of the possibilities. The scale, both lateral and vertical, is so great that if production is found, we can expect it to be substantial in terms of national needs."

If South Florida becomes an important oil-producing area it will perforce be a very important one, because it takes a lot of hole to reach the recognized potential reservoirs. And this hole can't be paid for by small pools.

Philip C. Ingalls.

For a thorough discussion of the general geology of Florida see E. D. Pressler's "Geology and Occurrence of Oil in Florida," A.A.P.G. Bulletin, October 1947.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

MONTANA . . . Shows at C. H. Murphy, Jr., 15 Unit in East Poplar field, Roosevelt County, have indicated the possibility of a new pay in that area. Operators have reported recovery of oil on test of a sand section in the Heath formation, which is the upper member of the Big Snowy group of Mississippian age.

OKLAHOMA . . . Carter Oil Co. has perforated casing from 6,526-54 ft. and more openings are being made for production tests of an indicated gas-distillate Morrow sand pay at 1 Tretbar, C NW NE 7-5n-22eCM, Beaver County wildcat. The pool opener or extension is located near Floris.

WEST TEXAS . . . Sinclair Oil & Gas Co. 1-101 University, 20 miles west of Eldorado in Schleicher County, finished as an Ellenburger discovery, flowing 342 bbl. of oil a day. The Texas Co. 1-AC State, Ellenburger strike west of Big Lake, completed for 273 bbl. of oil daily.

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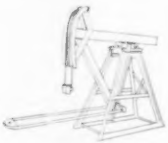

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Production String Being Run at Duval Prospect

CORPUS CHRISTI.—Sid Katz of San Antonio is running 5½-in. production string to total depth 4,434 ft. at 2 Altha G. Black, wildcat 10 miles northwest of San Diego in Duval County, after recovering oil on drill-stem tests. Operator ran test on interval 4,470½-82 ft., employing ¾-in. top and bottom chokes. Tool was open 12 minutes, and surface pressure was 570 psi. Recovery was 30 ft. oil; bottom-hole pressures 1,615 psi., flowing, and 1,880 psi., shut-in. Second test was run from 4,475-84 ft. With tool open 20 minutes, working pressure was 410 psi., and recovery was 90 ft. of oil, 60 ft. of water. Bottom-hole flowing pressure was 1,350 psi., shut in pressure 1,725 psi. The apparent discovery, in G. Huggins Survey 6, is about 670 ft. northeast of same operator's 1 Black, a 4,750 ft. dry hole.

Southern Minerals Corp. has opened new oil reservoir at its 1 T. D. Mansford et al, wildcat 7 miles southeast of Stockdale in Wilson County. Firm has proposed the name "Denhawken—basal Wilcox zone 2" for the area, which is about 4,800 ft. northeast of Denhawken gas field. On 24-hour production test 1 Mansford flowed 85.05 bbl. of 34.6°-gravity oil per day plus 12 per cent water, through ⅞-in. tubing choke. Tubing pressure was 160 psi., gas-oil ratio 340-1. Production is through 20 casing perforations 4,286 to 91 ft. Southern Minerals is drilling its 2 Mansford, a 933-ft. east-northeast offset to the discovery.

Wm. Herbert Hunt Trust estate 2 Emmo Herron, wildcat 5 miles northeast of Gregory in San Patricio County, has opened a new gas-condensate reservoir. Bottomed at 9,300 ft., with 4-in. liner run to total depth, wildcat was perforated from 8,920-24 ft. On ⅞-in. choke, tubing pressure was 3,000 psi., and the well flowed ungaged amount of gas and condensate, estimated 15 bbl. of condensate per million cubic feet of gas.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCATS

Kenedy County: Sun Oil Co. 236-1 B. Laguna State, Laguna Madre, TD 7,342 ft., PT 130,000 M.c.f. per day open flow on 11/64-in., gas-oil ratio 260,500-1, 47.8°-gravity oil.

San Patricio County: Drilling & Exploration Co. 1 Lula Lee Porterfield Est., Share 2, Geo. Sargent Sur., TD 9,580 ft., PT 29,000,000 cu. ft. of gas per day open flow, gas-oil ratio 13,700-1, 60.7°-gravity condensate.

Wilson County: Southern Minerals Corp. 1 T. D. Mansfort et al, J. F. Rodriquez Sur. 21, TD 4,607 ft., PT 85.05 bbl. of oil per day on ⅞-in. choke, gas-oil ratio 340-1, 34.6°-gravity oil.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Brooks County: Hamman Oil & Refining Co. and States Marine Corp. 1 Laurel Boedecker et al CCSD&RGNG RR Sur. 9, TD 6,538 ft., dry.

Duval County: F. P. Zoch, Jr. 1 Atlee Parr, San Andres Grant, TD 5,715 ft., dry.

Edwards County: Humble Oil & Refining Co. 1 O. D. Collins, GC&SF Sur. 73, TD 7,861 ft., dry.

Frio County: Beckman, Inc. 1 J. M. Riggan, BS&F Sur. 1, A-111, TD 4,161 ft., dry. J. C. McCabe & M. L. Wise 2 J. Otis Jones, Hooper & Wade Sur. 1, TD 3,314 ft., dry.

Guadalupe County: F. A. Gillespie & Sons

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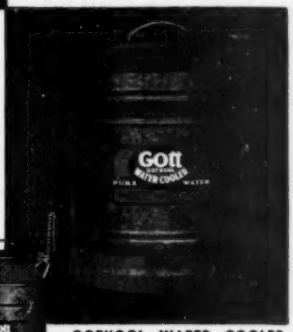

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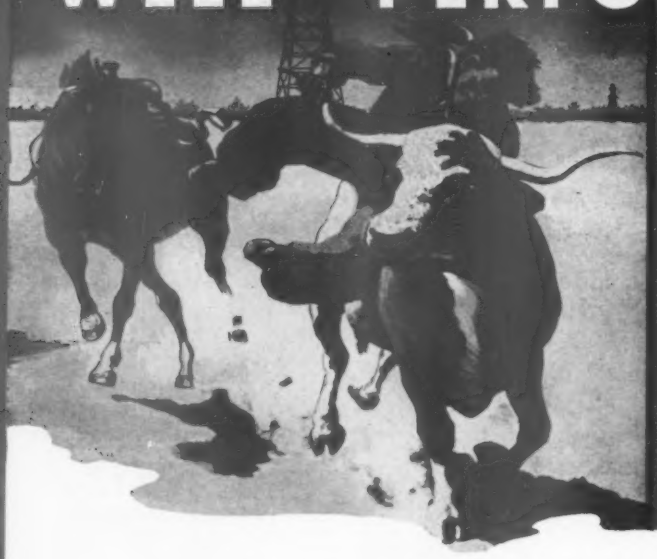

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Co. 1 Edward Schruab, Jas. Murphey Sur., TD 2,872 ft., dry.

Jim Hogg County: Bridwell Oil Co. 1 Jose M. Gutierrez, Noriecitas Grant, TD 4,502 ft., dry.

Miller & Pierce 1 J. Vela Pena, Blk. 45, El Peyote Grant, TD 3,216 ft., dry.

Jim Wells County: Delhi Oil Corp. 1 Mary A. Johnson, Los Presenos de Arriba Grant, TD 5,119 ft., dry.

Milam County: Green Bros. 3 R. F. Lindhorst, Jose Acosta Sur. Sur., TD 4,005 ft., dry.

Travis County: A. C. Schram 1 Oscar Hinze, Wm. Lewis Sur., TD 840 ft., dry.

Webb County: Hawn Bros. 1 Mrs. E. W. Dobie, GB&CNG Sur. 31, TD 3,010 ft., dry.

O. W. Killam A-1 Bruni Est. E½ Sur. 77, TD 3,818 ft., dry.

Willacy County: Humble Oil & Refining Co. T-2 Sauz Ranch-Tenerias, Share 64, San Juan de Carrioitos Grant.

Mississippi

Oil Shows in Cretaceous Reported at Madison Test

JACKSON.—In Madison County, Mississippi, approximately 4 miles southeast of Pickens field, Carter Oil Co., 1 S. L. Brown, Section 31-11n-4e, created a considerable amount of interest this week after coring shows of oil in what is now thought to be Lower Cretaceous sand. A show was picked up in samples at 6,316-23 ft., and a core was cut at 6,323-33 ft. with recovery being sand with excellent show of oil in the top 6 ft. and spotted show in the bottom 4 ft. A drill-stem test was then run 6,316-33 ft. using ⅜-in. bottom and ¾-in. top choke. Top pressure built up to 35 psi. in 26 minutes and gas was to surface in 41 minutes. Recovery from 66-minute test was 400 ft. of slightly oil-cut mud and 5,250 ft. of salt water. Bottom-hole pressure was 2,800 psi. flowing and 2,850 psi. shut in. Operators then ran another test using straddle packers to test the top part of the sand at 6,317-23 ft. Top pressure was only 1½ psi. and recovery only 630 ft. of slightly gas-cut mud and salt water. Bottom-hole flowing pressure was zero to 350 psi. Drilling was then continued and another show was encountered at 6,468-72 ft. by mud logging equipment. It is reported that a drill-stem test is now being run at 6,468-72 ft.

On the northwest side of Sandy Hook field, Marion County, Mississippi, Humble Oil & Refining Co. is running tubing on packer to complete 24 Sandy Hook Gas Unit, Section 10-1n-14e, as an oil well. Casing was run to 9,093 ft. and perforated 9,044-48 ft. opposite lower Tuscaloosa sand. On 20-hour drill-stem test the well flowed at the rate of 120 bbl. of 20.6°-gravity oil and 16.8 bbl. of mud and wash water per day with top pressure 75 psi. Production is from what is thought to be a thin oil column just above the water level.

In northwestern Adams County, Mississippi, the Gammill-Cashion 1 Stowers, Section 8-8n-2w, is testing on pump at the rate of 50 bbl. of 36°-gravity oil plus 75 per cent salt water per day. This prospective Wilcox discovery is testing from perforations at 5,637-38 ft.

MISSISSIPPI WILDCAT FAILURES

Harrison County: City Products Corp. 1 Laura G. Elmendorf, Sec. 13-6s-11w, TD 9,500 ft., dry.

Jefferson County: B. Serio et al 1 Phil Williams Est., Sec. 24-9n-1w, TD 4,050 ft., dry.

ALABAMA WILDCAT FAILURES

Coffee County: E. B. LaRue 1 Andrew Page, Sec. 6-6n-20e, TD 3,658 ft., dry.

Escambia County: W. G. Nelson 1 John Allen, Sec. 18-3n-13e, TD 5,174 ft., dry.

North-Central Texas

New Shallow Fry Strike Reported in Coleman County

WICHITA FALLS.—Coleman County gained a new shallow Fry sand discovery at Kenneth Rich and Morty Gresh 2 Pettaway, 8-445-P. Young Survey, 10 miles southeast of Santa Anna. Potential was an average flow of 20 bbl. hourly from pay at 1,278-1,302 ft.

Miami Operating Co., Inc. 1 W. E. Whitley, 26-2-T&NO Sur., Coleman County, finished as a Gray sand discovery, flowing 180 bbl. of oil a day from perforations at 3,836-38 ft.

Rapid development of the new White Flat field of northeast Nolan County was in prospect with four new wells slated during the week. American Trading & Production Co. staked locations for 1, 2 and 3 A. H. McElmurray, all in 36-20-T&P Survey, 2 miles south and slightly east of Herndon. Payne-Johnson, discoverers of the field, will drill 1 B. L. Bond in Section 287, John Clark Survey, which is a south offset to 1 McElmurray, Strawn discovery for the field. Production in the field now comes from the Strawn, Caddo, conglomerate and Ellenburger.

In Grayson County, Howell, Holloway & Howell 1 Earl, 2 miles southwest of Whitesboro, were running pipe after drill-stem testing at 5,250-80 ft. Recovery was 360 ft. of oil and 180 ft. of oil-cut mud.

L. O. McMillan 1 Suddath Brothers, 1 mile northwest of Sandusky and west of Oil Creek sand producers, finished as a Strawn discovery at 6,604-64 ft. Production was 100 bbl. of oil a day through ⅞-in. choke.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: S. F. Hutcheson 2 Jones Bros., John Richards Sur. 90, A-367, TD 1,374 ft., pay 1,112 ft., IP pumped 50 bbl. 38°-gravity oil.

Brown County: C. U. Norton 3 W. H. G. Chambers, Sec. 147, G. Logan Sur., TD 1,321 ft., elev. 1,547 ft., pay 1,304 ft., IP 99 bbl. 44°-gravity oil, 8/64-in. choke, TP 45 psi., GOR 1,000 cu. ft.

Coleman County: W. J. Murray and J. L. Collins 1-A Schneider, Sec. 5, T&NO Sur., TD 1,998 ft., elev. 2,018 ft., pay 1,964 ft., IP pumped 7 bbl. 41°-gravity oil.

Horace White 4 Moseley, Sec. 40, HT&B Sur., TD 3,470 ft., elev. 2,021 ft., Gardner sand pay 3,367 ft., IP 312 bbl. 44°-gravity oil, 20/64-in. choke, GOR 400 cu. ft.

Fisher County: F. B. Wimberly 2 T. F. Holman, Sec. 13, J. J. Swanson Sur., TD 4,600 ft., elev. 1,773 ft., pay 4,439-47 ft., IP 288 bbl. 42°-gravity oil, 16/64-in. choke, TP 480 psi., GOR 157 cu. ft.

Jack County: W. T. Waggoner 1 Dearing & Sons, N. B. Overby Sur., A-452, TD 3,397 ft., elev. 1,191 ft., pay 3,054 ft., IP pumped 75 bbl. 40°-gravity oil.

Montague County, NE extension to Underwood-Ray field and new-pay discovery: McQueen & Clevinger 1 Connie Jackson, Blk. 26, Limestone CSL, A-421, TD 6,133 ft., elev. 966 ft., conglomerate pay 6,110 ft., IP 252 bbl. 42°-gravity oil, 12/64-in. choke, TP 850 psi., GOR 600 cu. ft.

Throckmorton County: Hale Bros. 1 Polk CSL, Sec. 7, Polk CSL, A-239, TD 5,015 ft., elev. 1,252 ft., pay 3,818 ft., IP pumped 145 bbl. 39°-gravity oil.

Wilbarger County: Ira B. Taylor 1 Donia Wheeler, 56-4-H&TC, TD 1,954 ft., pay 1,947 ft., IP pumped 24 bbl. 39°-gravity oil.

Frank Wood 1 W. T. Waggoner "Larry," 26-4-H&TC, TD 2,378 ft., elev. 1,137 ft., pay 2,358 ft., IP pumped 29.6 bbl. 37°-gravity oil.

Young County: T. F. Hunter 1 V. Holcomb, P. S. George Sur., A-109, TD 2,700 ft., pay 2,692 ft., IP pumped 76.5 bbl. 41°-gravity oil.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: Hale & West 2 Christian, Sec. 16, W. L. Herring Sur., A-168, dry, TD 3,984 ft.

Lewis W. Welch 1-B G. A. Key, Allison Armes Sur., A-5, dry, TD 5,629 ft.

Brown County: Golightly Construction Co. 1 R. F. Potter, Sec. 100, J. Douglas Sur., dry, TD 2,004 ft.

Coleman County: Ultra Oil Co. 1 Sealy-Smith, Sec. 79, GH&H Sur., dry, TD 4,061 ft., elev. 1,733 ft., Caddo 3,300 ft., Ellenburger 3,990 ft.

J. M. West 1 C. W. Pitts, W. Wallingford Sur., dry, TD 4,624 ft.

Cooke County: Humble Oil & Refining Co. 1 Virginia Castle, Lot 6, A. Hilburn Sur., dry, TD 7,095 ft.

L. O. McMillan 1 Susan Farr, J. W Germany Sur., A-1,373, dry, TD 5,344 ft.

Leo Swick and Ralph Snuggs 1 Davis, R. Hutchinson Sur., A-471, dry, TD 4,155 ft.

Denton County: J. R. White 1 Nick Noss, Lot 6, Denton County line, Curbello Sur., A-217, dry, TD 4,014 ft., elev. 620 ft., Dornick Hills lime 3,655 ft., Ellenburger 3,825 ft.

Eastland County: Bay Petroleum Corp. and R. E. Reid 1 Hawkins, Spires Dooley Sur., A-77, dry, TD 3,797 ft., Mississippian 3,723 ft.

Fisher County: Roark, Hooker, Perini and Peeler Bros. 1 Mrs. F. L. Jameson, 111-1-H&TC, dry, TD 5,810 ft.

Southern Minerals Corp. 1 T. F. Hefner, 45-3-H&TC, dry, TD 7,204 ft., elev. 2,070 ft., Mississippian 6,791 ft., Ellenburger 6,941 ft.

Jack County: M. E. Andrews and American Drilling Corp. 2 Richards, N. Atkinson Sur., A-17, dry, TD 5,142 ft.

Walter T. Hyde 1 G. N. Wolfe, W. P. Dickinson Sur., A-1,067, dry, TD 644 ft.

Lebus Bros. 1 G. C. Rounsaville, Rebecca Parker Sur., A-461, dry, TD 3,975 ft.

Wichita River Oil Co. 1 J. Crowley, W. Crowley Sur., A-2,187, dry, TD 3,800 ft., elev. 960 ft., Vogtsberger 3,660 ft.

Jones County: Robinson-Puckett 1 Mintie Brown, 16-1-T&NO, dry, TD 5,267 ft., elev. 1,667 ft., Caddo 5,138 ft.

Sojourner Drilling Co. 1 Mrs. P. Young, Sec. 359, Lot 2, Goliad CSL, dry, TD 3,357 ft., elev. 1,818 ft., Cisco base 3,290 ft., top Swastika 3,322 ft.

Knox County: Mrs. James R. Dougherty 1 Sullins, 65-B-GH&H, dry, TD 6,021 ft.

Montague County: Benbrook Oil Corp. 1 R. L. Pierce, ETRR Sur. 19, A-237, dry, TD 5,734 ft.

Miami Operating Co. M. M. Gilbert, Sec. 56, MEP&P, A-530, dry, TD 5,978 ft.

Shackelford County: C. W. Gore 1 H. C. Clemmer, 64-14-T&P, dry, TD 4,500 ft.

Stephens County: F. William Carr 1 R. E. Singleton, Sec. 37, OAL Sur., dry, TD 4,455 ft.

Throckmorton County: Lewis Mahan 1 Morrison, Sec. 6, Comanche Indian Reservation Sur., dry, TD 2,915 ft.

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Young County: 1. Dee Campbell 1 Haygood, Blk. 1,466, TE&L Sur., A-892, dry, TD 3,690 ft.

A. R. Dillard 1 Frank Loftin, S. Tynes Sur., A-274, dry, TD 3,540 ft.

Ralph Harper 1 Allar, TE&L Sur., dry, TD 3,090 ft.

Kiel and Glade 1 Mrs. G. E. Grubbs, Sec. 636, TE&L Sur., A-794, dry, TD 4,115 ft., elev. 1,183 ft., Caddo 3,988 ft.

W. C. Wainwright 1 H. Dunn, TE&L Sur. 179, A-426, dry, TD 1,013 ft.

South Louisiana

New Distillate Pay Opened In Lake Arthur Field

NEW ORLEANS.—Union Sulphur & Oil Corp. has opened a new gas-distillate pay on the southeast flank of Lake Arthur field of Jefferson Davis Parish. It is the 1-A W. E. Walker, located in Section 36-10s-4w. Discovery has total depth of 13,148 ft., casing cemented on bottom. From perforations 12,395-410 ft., well flowed 100 bbl. of distillate 40.7°-gravity plus 2,400,000 cu. ft. of gas daily on 7/64-in. choke. Gas-condensate ratio was 24,200-1, no water. Tubing pressure was gaged at 4,800 psi.

Ted Weiner has cored discovery sands in the 2-A Wylie confirmation attempt in a new oil discovery area north of Lake Hatch gas field in Terrebonne Parish, and prepares to run open hole drill-stem test. It spots in Section 89-17s-16e. Core was cut 9,646-56 ft., recovering 3 ft. shale, no odor or cut. A core at 9,656-66 ft. had 6 ft. recovery, being 5½-ft. shale, 1½-ft. of sandy shale with faint odor, no cut. Last 10-ft. core was pulled from 9,666-76 ft. Recovery was ½-ft. stickey shale, 1 ft. shale and lime with fluorescence, no cut; 3½-ft. fine light gray sand with good odor; 2½ ft. fine grained porous sand with good odor; 3 ft. of hard shale with fair odor; 1½ ft. of very porous gray sand, odor questionable no cut.

Major extension and new pay opener has been reported by The Texas Co., 4,000 ft. southwest of nearest production in Caillou Island field of Terrebonne Parish. Well is designated 49 State Lease 188-Terrebonne Bay, located 4,075 ft. from USC&GS Station "Lou" in Timbalier Bay, 23s-19e. Well was drilled to 11,821 ft. set 7-in. casing to 11,501 ft. and a liner to bottom. From perforations 11,505-15 ft., well produced at rate of 199 bbl. of 47.4°-gravity oil per day on 1/6-in. choke, tubing pressure 3,950 psi., ratio at 12,098-1. There was no evidence of formation water in the initial test.

SOUTH LOUISIANA SUCCESSFUL WILDCAT

Plaquemines Parish: The California Co. 1 St. Lse. 2127, offshore, TD 10,075 ft., PT 149 bbl. of oil per day on 9/64-in choke, plus 30 per cent b.s. and w., gas-oil ratio 544-1, 34.6°-gravity oil.

SOUTH LOUISIANA WILDCAT FAILURES

Cameron Parish: Humble Oil & Refining Co. 1 Vincent & Welch, Sec. 21-14s-4w, TD 12,396 ft., dry.

Jefferson Davis Parish: H. L. Hunt 1 Mrs. Florence A. Daggett, Sec. 15-7s-3w, TD 8,950 ft., dry.

Plaquemines Parish: Richardson & Bass 1 John Myers Co., Sec. 41-19s-28e, TD 11,268 ft., dry.

Rapides Parish: Richardson & Bass 1 Crowell Ld. & Min. Corp., Sec. 20-1s-3w, TD 13,000 ft., dry.

Texas Gulf Coast

Gas Discovery Finaled In North Durkee Area

HOUSTON.—Sinclair Oil & Gas Co. has completed its 1 Carrie House as a new gas discovery in the North Durkee area of Harris County, 3½ miles east of North Houston. Well drilled to 7,495 ft., planted 5½-in. production casing to 7,453 ft. and extensively tested before finding successful zone from 7,312-16 ft. On calculated open flow of this interval well produced 2,420,000 cu. ft. of gas per day plus some 52°-gravity condensate with a ratio of 95,000-1, and a shut-in pressure of 2,500 psi. Well flowed gas from 7,354-58 ft. before dying and recovered salt water and gas and salt water from 7,337-40 ft. A slight amount of oil was recovered from 7,084-86 ft. and also from 7,080-85 ft.

Greenbrier Oil Co. has moved northwest of its oil discovery, the 1 H. C. Munson, to stake the 2 Munson for confirmation. Location spots on the Samuel Carter Survey, A-53, 7 miles west of Angleton. Operator will carry the well to 12,000 ft. seeking production found in the discovery well from 11,162-169 ft. The discovery well produced 274.31 bbl. of 36.2°-gravity crude daily on potential flowing through a 10/64-in. choke under a tubing pressure of 1,850 psi.

Cron & Gracey have staked location for a new 8,500 ft., wildcat in Orange County, 2 miles east of the town of Mauriceville and about 2⅝ miles south of the Lemonville area. Well is designated the 1 H. J. L. Stark, falling on the J. A. Richardson Sur., Section 16, A-347. The Lemonville area spots primarily in Newton County and produces oil from the First and Second Hackberry sands of the Frio from 7,264-312 ft. and oil from the Nodosaria from 7,730-44 ft. and also gas from the Nodosaria from 7,648-60 ft.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Hardin County: Shell Oil Co. 1 Kirby Lumber Corp. Tr. 152-A, H&TC Sur. 224, TD 10,201 ft., PT 56.81 bbl. of oil per day on 7/64-in. choke, gas-oil ratio 9,000-1, 31°-gravity oil.

New pay, Shell Oil Co. 2 Kirby Lumber Corp. Tr. 110-A, H&TC Sur. 219, TD 7,310 ft., PT 4,932,000 cu. ft. of gas per day on 24/62-in. choke, gas-oil ratio 43,500-1, 62°-gravity oil.

Jefferson County: New pay, Spindletop, Al Brown and Gulf Oil Corp. 1 McFadden "A," P. Humphrey Sur., TD 4,575 ft., PT 121 bbl. of oil per day on 10/64-in. choke, gas-oil ratio 207-1, 31.5°-gravity oil.

Live Oak County: The Chicago Corp. 5 J. I. Hailey, J. Billingsley Sur., TD 4,321 ft., PT 208.05 bbl. of oil per day on ⅝-in. choke, gas-oil ratio 284-1, 36.4°-gravity oil.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Austin County: American Republics Corp. 1 Vick L. Boyd et ux, S. F. Austin Lge., A-7, TD 5,496 ft., dry.

Goliad County: Paisano Trading Co., Ltd., 1 B. M. Lucas, W. P. Miller Sur., A-193, TD 5,616 ft., dry.

Harris County: A. W. Head, J. L. Welch, Jr., and N. H. McCord 1 Arthur Brautigam, Wm. Hobby Sur., TD 5,800 ft., dry.

Jackson County: Southern Minerals Corp. 1 L. Ranch Co., Richard Royall Sur., TD 9,736 ft., dry.

Live Oak County: Dallas Husky 1 Mrs. Nellie Lang, Thos Adams Sur., TD 1,198 ft., dry.

V. G. Schimmel 1-A C. W. Christensen, Willis L. Nowell Sur., TD 4,011 ft., dry.

Liberty County: Atlantic Refining Co. 1 Nona Mills "A," Manuel de Los Santos Coy Lge., TD 8,511 ft., dry.

Victoria County: Harry Bass Drilling Co. 1 Selina Mernitz et al, Edw. Linn Sur., TD 1,650 ft., dry.

John F. Camp 1 J. J. Beall, P. Holmes Sur., TD 3,311 ft., dry.

Wharton County: Corley & Geiselman 1 Isabella Antonette Hogg et al, E. C. Ogden Sur., TD 6,190 ft., dry.

Smith & Smith 1 George P. Krenek, Joseph Newman Sur., TD 7,513 ft., dry.

Louisiana-Ark.

New Discovery Reported Northwest of Wildsville

SHREVEPORT.—Barnett Serio is reported to have a new discovery 1 mile northwest of production in Wildsville field, western Concordia Parish. Operators are running production tests according to reports at 1 Savage, new indicated Wilcox oil discovery, in the C NE NE 12-7n-6e. Oil sand was topped at 5,097 ft. The wildcat is on a separate structure from Wildsville field, being cut off from that field by two dry holes.

In Red River Parish O. D. Clark Oil Co. is preparing to squeeze and reperforate at 1 Marston, 19-14n-10w. Operators will then try another completion attempt in the Woodbine. The first test of the Woodbine from perforations at 2,619-20 ft. showed some oil and gas.

Arkansas Louisiana Gas Co. is coring

WISCONSIN-POWERED Pipe-Coating and Wrapping Machine
Power to Fit the Job
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*Power for this unit is a model VF4-D V-type 4-cylinder engine developing 25 hp.
A Line Traveling Coating and Wrapping Machine built by Perrault Bros., Tulsa, Oklahoma. And the part played by the Wisconsin Heavy-Duty Air-Cooled Engine is an interesting one.
It propels the machine forward, pumps hot enamel from tar kettle to pipe. It even powers the wrapping head applying the protective felt.
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MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines
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OIL FIELD DISTRIBUTORS FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS.

ahead below 9,050 ft. after an inconclusive test of a 7-ft. "D" sand section in the Cotton Valley at 1 Wyatt Lumber Co. in Section 24-19n-14w, wildcat on the south flank of Hico-Knowles field, Lincoln Parish. The "D" sand was topped at 8,875 ft. by samples, and had 7 ft. of porous and permeable sand with condensate odor and stain. The well lies 1⅜ miles south of nearest production in Hico-Knowles field. The "D" sand is new for the area.

Arkansas.—Hunt Oil Co. has an indicated Hill sand producer in Springhill field at a wildcat just off the west side of the field. Operators are drilling ahead at 5,693 ft. at 2 B. L. Dennis in Section 11-20s-23w, Columbia County. Production was indicated on a 25-minute drill-stem test from 5,050-95 ft. The wildcat, projected to the Pettit lime at 6,000 ft., is ½ mile west of Tokio production in Springhill field.

Carter Oil Co. has completed 1 Goodwin et al, wildcat ¼ mile south of Moro bay town in the Pigeon Hill area of Union County, pumping 53 bbl. of 15°-gravity oil per day from the Cotton Valley at 4,287-97 ft. and 4,300-01 ft.

LOUISIANA WILDCAT FAILURES

Concordia Parish: Barnett Serio et al 2 Concordia Bank & Trust Co., 32-8n-9e, dry, TD 6,104 ft.

Justiss-Mears Oil Co. 1 Merrill, 36-7n-9e, dry, TD 7,414 ft.

Sabine Parish: Carter Oil Co. 1 Ammons, C SE NE 16-5n-12w, dry, TD 4,605 ft.

ARKANSAS SUCCESSFUL WILDCAT

Union County: Carter Oil Co. 1 S. M. Goodwin et al, 840 ft. N and 700 ft. E of SWc NW 28-16s-12w, pumped 50 bbl. of oil from the Cotton Valley 4,287-97 ft., 4,300-01 ft., TD 5,100 ft. (discovery tentatively called Pigeon Hill).

ARKANSAS WILDCAT FAILURES

Columbia County: Burnett Producing Co. 1 Southern State College "A," C W½ SE SW 36-16s-21w, dry, TD 4,515 ft.

Hempstead County: V. S. Parham et al 1 Flowers, 17-10s-25w, dry, TD 1,475 ft.

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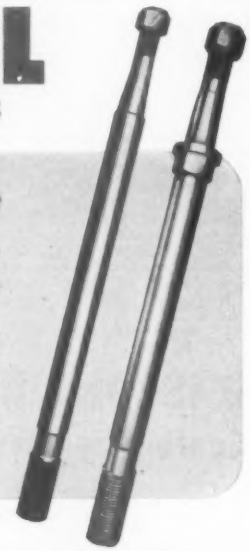

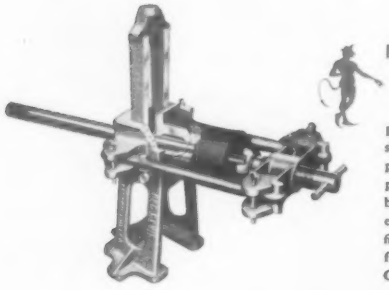

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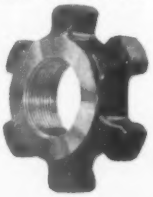
Complete information in Composite Catalog or write for price catalogs noted above. Red Devil products are available through your supply store.



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Permian Basin

Reef Production for Vealmoor Area Seen

MIDLAND.—Stanolind Oil & Gas Co. had prospects of discovery reef production between Vealmoor and East Vealmoor fields of northern Howard County at 1 Minnie Smith.

Top of the reef limestone was placed at 7,767 ft., minus 5,142 ft., on samples. Drill-stem test from 7,769-82 ft. had gas in 39 minutes and recovered 90 ft. of free oil, and 330 ft. of fluid that was 50 per cent oil. Operators cored from 7,782-88 ft. but recovered only 1 ft. of lime having scattered porosity and stain. Further testing was scheduled. Samples from the first 13 ft. of reef section had 50 per cent pin-point porosity with light staining. Top of the reef may indicate a new structure, which was 181 ft. low to an edge well in East Vealmoor field and 65 ft. high to a dry hole on its west side. Location is in 45-31-T3N-T&P.

In northwest Terry County, Great Western Drilling Co. 2 Claire, east offset to the firm's 1 Claire, flush Glorietta discovery, found the same pay section and had made a high flow rate on first drill-stem test.

Cores from 5,925-60 ft. recovered 35 ft. of lime with an estimated 16 ft. of pay, and cores from 5,960-70 ft. recovered 10 ft. of porous, saturated lime. Drill-stem test from 5,918-70 ft. had flowing oil in 2 hours and 25 minutes and in the next 20 minutes produced 50 bbl. of oil. Recovery was a pipe full of oil with no formation water. Location is about 5 miles northeast of Glorietta production.

Sinclair Oil & Gas Co. 1-101 University, northwest Schleicher County Ellenburger discovery, completed for 342 bbl. of oil a day. The gage was through open 2-in. tubing from open-hole pay between 7,910-8,045 ft. Top of the Ellenburger was 7,782 ft., minus 5,272 ft.

The Texas Co. 1-AC State, west of Big Lake in Reagan County, completed as an Ellenburger discovery, flowing 273 bbl. of 39°-gravity oil. Production was through 18/64-in. choke on perforations at 9,410-9,500 ft. Top of the Ellenburger was 9,277 ft. on elevation of 2,699 ft. Thorough testing of this well started from the bottom at 9,704 ft., which produced mostly water by swabbing, until the pay section was determined.

Humble Oil & Refining Co. 1-Q University, Andrews County, was coring ahead to establish the water level in the Devonian. Drill-stem tests at 12,460-87 and 12,484-511 ft. flowed oil at the rate of 82 and 95 bbl. an hour, respectively.

Cities Service Oil Co. and Skelly Oil Co. 1-B Cross, northwest Glasscock County, found sulfur water in the Ellenburger in drilling to 11,195 ft. and after electrical surveys have been completed, will plug back to try for completion in the Pennsylvanian. Drill-stem tests in that formation around 9,812-80 ft. flowed 23 bbl. of oil in 3 hours.

Gulf Oil Corp. 1 Northrup, Reeves County deep test, was reported drilling at 14,346 ft. in sand and shale.

Phillips Petroleum Co. has scheduled further deep work in the area of its 1-CC University Devonian discovery northwest of Magutex in Andrews County. Latest is to be the 1-UU University in Section 1, Block 3, northwest stepout to its discovery. Projected depth was 14,000 ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Culberson County: Ralph Lowe 1-A State, 9-45-PSL, TD 3,024 ft., elev. 3,185 ft., Delaware sand 2,670 ft., IP pumped 26 bbl. 22°-gravity oil.

Terry County: Cities Production Co. 1-D Starnes, 2-M-TTRR, TD 12,140 ft., elev. 3,167 ft., Fusselman pay 11,615 ft., IP 575 bbl. 39°-gravity oil, ¼-in. choke, GOR 61 cu. ft., TP 200 psi.

Upton County: Trebol Oil Co. and E. G. Rodman 1 Redford Grocery, Sec. 1, Certificate 4-816, GC&SF Sur., TD 1,754 ft., elev. 2,387 ft., pay 1,745 ft., IP 959 bbl. 26°-gravity oil, ½-in. choke, TP 150 psi., GOR 750 cu. ft.

Ward County: Gulf Oil Corp. 276 Hutchings Stock Association, 82-N-G&MMB&A, TD, 3,270 ft., elev. 2,598 ft., pay 2,915 ft., IP 348 bbl. 35°-gravity oil, ½-in. choke, TP 25 psi., GOR 143 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Borden County: Fullerton Oil Co. 1 Griffin, 57-25-H&TC, dry, TD 6,978 ft.

Crockett County: Barron Kidd 1-66 Christine Bean, 66-OP-GC&SS, dry, TD 1,250 ft., elev. 2,584 ft., Yates 916 ft.

King County: Continental Oil Co. 3 Alexander Est., 89-F-H&TC, dry, TD 6,600 ft., elev. 1,749 ft. estimated, Mississippian 6,105 ft., Ellenburger 6,422 ft.

McAlester Fuel Co. 1-A Sallie Starr McGee, Sec. 15, TTRR Sur., dry, TD 6,849 ft., Mississippian 6,194 ft., Ellenburger 6,750 ft.

Martin County: Tide Water Associated Oil Co. 1 Dickenson, 5-37-T1S-T&P, dry, TD 12,276 ft., Strawn 10,345 ft., Devonian 11,370 ft., Ellenburger 12,250 ft.

Reagan County: Atlantic Refining Co. 1 University 48-F, 14-48-University, dry, TD 9,774 ft., elev. 2,772 ft., Wolfcamp 6,502 ft., Ellenburger 9,145 ft.

Sutton County: Mayfair Minerals, Inc. 1 C. D. Wyatt, 50-A-DWT&P, dry, TD 4,500 ft., elev. 2,478 ft., Strawn 4,016 ft., Ellenburger 4,296 ft.

C. L. Norsworthy, Jr. 1 Sam Allison, 44-B-HE&WT, dry, TD 7,214 ft., elev. 2,352 ft., Ellenburger 6,695 ft.

Tom Green County: J. C. Coleman 1 Stanford, A. Leitenberg Sur. 824, dry, TD 305 ft.

John Odstricil 1 Stanford, Leitenburg Sur. 824, dry, TD 500 ft.

Sun Oil Co. 1 Otto Dierschke, Sec. 67, SPRR Dist. 11, dry, TD 5,066 ft., elev. 1,863 ft., Strawn 4,603 ft., Palo Pinto 4,096 ft.

SOUTHEAST NEW MEXICO

Skelly Oil Co. 1-S State, 1-mile south extension to the East Caprock field, had prospects of flush production from the Wolfcamp, based on a drill-stem test from 8,553-8,643 ft. On the test, oil flowed in 15 minutes, and after cleaning for 25 minutes, gaged 213 bbl. of oil in 5½ hours. Driller's top of the Wolfcamp was 8,555 ft. on derrick floor elevation of 4,346 ft. Offset acreage is held by Brown & Wheeler, Amerada Petroleum Corp., Magnolia Petroleum Co. and Cities Service Oil Co.

Skelly 1-S State was originally slated as a Devonian exploration, and plans to drill ahead or complete had not been announced.

Sinclair Oil & Gas Co. 1 Lee Whitman, 1-mile northeast extension try to Denton-

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R-P&C valves

Devonian field, recovered 30 ft. of drilling mud with no shows on a test from 12,238-330 ft. Top of the Devonian was 12,232 ft., minus 8,420 ft.

Texas Pacific Coal & Oil Co. 1 Lane-Mill Unit, 32-15s-32e, west of South Saunders field, unloaded oil when pulling pipe after a drill-stem test in the Pennsylvanian from 9,695-9,807 ft. When down to 4,900 ft. of pipe, the well began unloading. Total recovery was 3,000 ft. of oil, 400 ft. of oil and gas-cut mud and 20 ft. of fresh water.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Lea County: Amerada Petroleum Co. 1 H. A. Crowley, 12-11s-32e, dry, TD 11,075 ft., elev. 4,357 ft., Pennsylvanian 8,362 ft., Mississippian 10,568 ft., Devonian 11,003 ft.

Canadian Fields

Six New Finds Reported For the Week in Alberta

CALGARY.—The past six days of exploration drilling in western Canada has brought the nation another six new discoveries, including three that are chalked up as oil strikes and three gas finds. All these discoveries, during the first week of February, were made within the borders of Alberta, Canada's major oil and gas province.

The six new strikes came at five wildcats, one of which discovered natural gas in two formations, and one of the oil strikes that was recorded as an oil discovery in a higher zone during the previous month. The other new finds were single oil or gas discoveries.

One of this week's new discoveries was made in the Peace River region of northwest Alberta, 1953's first oil strikes in that area during the current year. This significant find, was made in the Beaverhill Lake section of the Devonian formation, by the team of Shell Oil Co. and Imperial Oil, Ltd. Drill-stem test from 6,793-6,824 ft. flowed 30.5°-gravity crude oil at an estimated rate of 500 bbl. daily. However, when drill pipe was pulled it was found to contain 2,570 ft. of oil plus 1,350 ft. of salt water. It has not as yet known how much water-free oil zone was present, and crew was running electrolog to determine the pay thickness.

This Springburn strike in LSD 14, 34-80-17w5, is 200 miles northwest of Edmonton, 32 miles southeast of Peace River town and 63 miles northeast of Amerada's Devonian oil discovery that was drilled in 1952.

Dual zone Devonian oil production was assured this week near Legal, 20 to 25 miles north of Edmonton, when Union of California's Fairydell driller entered D3 Devonian oil-saturated porosity, and gave up light gravity oil during drill-stem test. This venture struck 25°-gravity oil in the D2 horizon in January, found some 25 ft. of porous pay zone, and after boring into the D3 drill-stem test from 4,012-24 ft. gave up 3,280 ft. of 28 to 30°-gravity crude oil. Approximately 20 ft. of oil pay has been so far penetrated, and well was attempting drill-stem test at bottom 4,043 ft. over the week end.

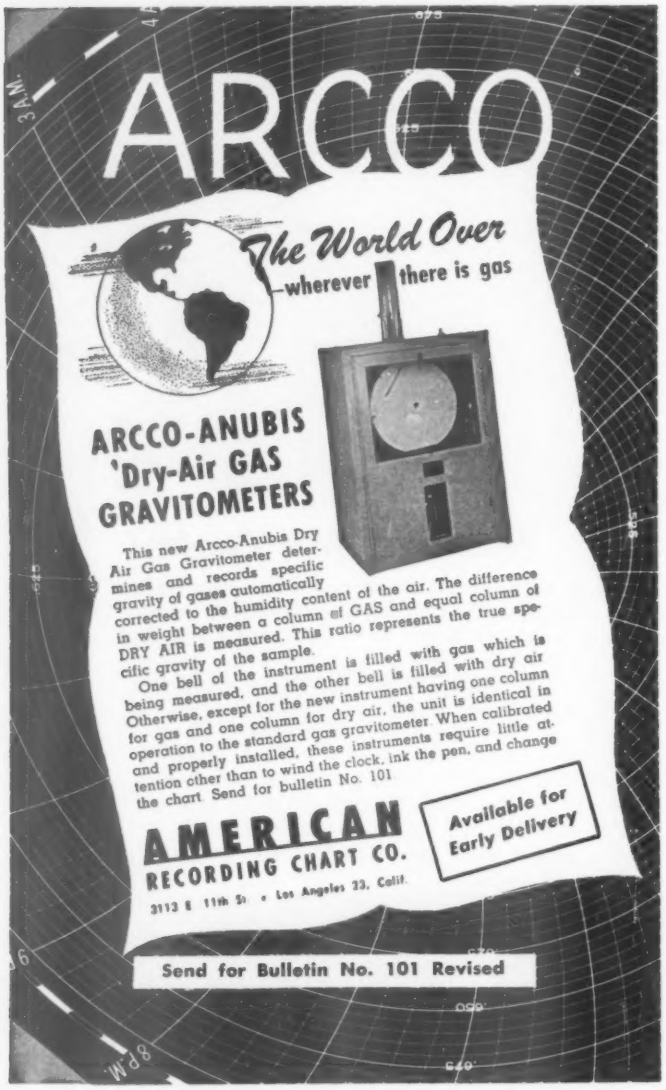
This Legal region discovery well, in an area where Viking gas and oil had previously been encountered, was also assured of a prolific gas-bearing section in the Viking, having encountered 80 ft. of gas zone prior to heading in search of Devonian production. Site is on LSD 3, 21-57-24w4.

Southern Alberta, which has yielded several oil strikes during January of this year, accounted for western Canada's other February oil discovery. Oil at this venture, which is in the Grassy Lake area, came from the Ellis sand of the Jurassic formation. Approximately nine feet of oil pay zone was encountered at the well, from 3,035-3,044 ft., and gravity of the oil is of medium grade. Crew was running string of production casing over the week end, preliminary to further evaluation tests.

This discovery well, Grassy Lake 1 Glenphyll LSD 7, 10-11-13w4, 25 miles northeast of Taber oil wells, lies about 45 miles west-southwest of Medicine Hat city and 9 miles west of Bow Island area gas wells. Prior to entering the Ellis oil sand, 1 Grassy Lake was recorded as a gas discovery (with flow of 1,200,000 cu. ft. daily), from the Bow Island sand.

Alberta's dual horizon gas discovery this week was drilled by Canadian Gulf Oil Co. at a site some 25 miles northeast of Nevis area gas and oil production in the central sector of the province. This gasser, in the Donalda area, is Gulf-C.P.R. 3 Dennis, LSD 3, 35-42-19w4. First gas strike came in the Viking sand, where flow rate was 3,500,000 cu. ft. daily from drill-stem test of interval 3,174-98 ft. The other productive zone was the Cretaceous, where test in the interval 3,560-74 ft., flowed gas at 5,040,000 cu. ft. daily and 35-minute pipe recovery was 3 ft. of condensate. Hole is deepening, in search of Devonian production.

The other gas strike was made in the Killam area, at a wildcat that was drilled by a team comprised of Marwayne Oils, Dragon Oils & Gas, Phillips Petroleum (Oklahoma), Husky Oil & Refining and Banff Oils, on farmout from Hudson's Bay and Anglo Canadian. Well had given a slight showing of gas in the Viking prior to deepening for lower objectives, but was non commercial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from that zone. Electrolog was run, and on the basis of that result, hole was plugged back to the Cretaceous, and test from 3,004-14 ft., flowed gas at rate nearly 3,000,000 cu. ft. per day. Recovery was 5 ft. of salt water in 1 hour. Well bore is now being cased, and potential test will likely be run soon, in an effort to determine its commercial worth.

This gasser is in LSD 5, 29-42-13w4, about 90 miles southeast of Edmonton, and about 25 to 30 miles southwest of the huge Viking-Kinsella gas field in central east Alberta.

EASTERN CANADA

Ontario.—In Lambton County, De Mers Engineering of Washington, D. C. has completed a 4-year program of geophysical study and general research in preparation for actual drilling on 3,400 acres lying between Petrolia and Sarnia. Following preliminary expenditures of some $80,000, a million dollar exploration program is contemplated, to test structures underlying the once-extensive shallow oil fields developed at Petrolia and to the north and west nearly 90 years ago. The original shallow fields in this area are slowly declining, but the operators estimate that reserves of 36,000,000 bbl. may underlie them, as much as 3,000 ft. below the surface. A few isolated tests of the Trenton limestone to this or greater depth were unsuccessful, except for some gas encountered at Oil Springs.

West Petroleum, Ltd., of Toronto has secured a lease of 6,488 acres underlying Lake Erie, opposite Romney township in Kent County; and a new lease of similar dimensions adjacent to its original holdings. The company is planning to drill additional gas wells this year.

Eastern Texas

Robertson Wildcat Plugs Back for Rodessa Try

DALLAS.—Union Producing Co. 1 Gibson, Robertson County wildcat 5 miles northeast of Calvert, plugged back to try for completion in the Rodessa after drilling dry to the Travis Peak at 8,053 ft. A previous drill-stem test in the Rodessa at 6,157-72 ft. returned gas and gas-cut mud.

Humble Oil & Refining Co. 1 Keith established Rodessa oil production in Scottsville field of Harrison County. Completion was for 281 bbl. of 42°-gravity oil a day through ¼-in. choke, from perforations at 5,301-24 ft. Total depth was 6,609 ft.

In Wood County, L. A. Grelling 2 Mary Saner, second well for the new field, recovered 4,000 ft. of oil with no water on a 15-minute drill-stem test in the Woodbine at 5,404-28 ft. A previous test in the sub-Clarksville at 4,845-50 ft. recovered salt water with no shows. Location is northeast of the discovery, which produces from the Woodbine at 5,348-52 ft.

C. E. Hyde and P. N. Wiggins Jr. 1 E. L. Lancaster and G. A. Gamble is a new 6,000-ft. exploratory test for southwest Henderson County. Location is in the William Keese Survey, 2 miles north of Cayuga field. Delta Drilling Co. has the contract which calls for an 8,700-ft. hole, or higher production.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Cherokee County: L. A. Grelling 1 E. C. Ragsdale, Jose Pineda Sur., A-40, dry, TD 5,297 ft.

W. B. Hinton 1 Cora Helen Tipton, Levi Johnson Sur., A-466, dry, TD 8,981 ft.,

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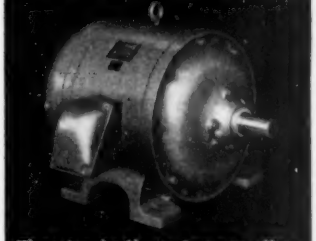
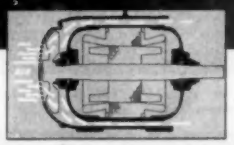


They're built to ignore dirt, dust and corrosive vapors



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CAST IRON construction is one of the many outstanding features which makes these motors superior under service conditions involving dirt, dust and corrosion. Cast iron frame, cast iron end bells—the complete enclosure is cast iron—all exposed parts are cast iron. Ideal for petroleum, chemical and other rugged industrial applications.

SMITHway totally enclosed fan-cooled motors are built to standard NEMA frames to meet the highest standards of electrical performance. TEFC motors are built in sizes from 5 to 125 HP. Parts and service available throughout U.S.A. Get complete information from nearest office or write today.

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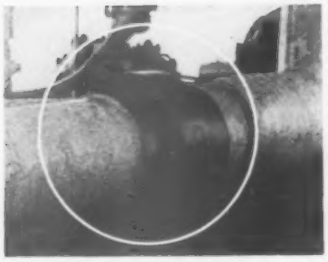

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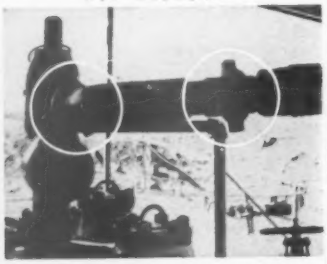

Weco Fig. 400 unions save time in connecting up pump discharge lines.

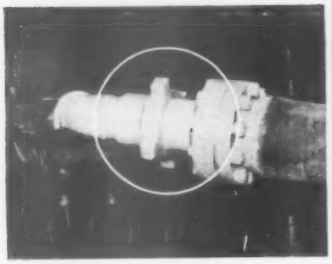

Fig. 400 Union on mud line.

4" Weco Fig. 400 Union on stand pipe.

● Unions in service on drilling rig lines get a lot of rough treatment. These mud, steam, water, oil, gas and other lines are made up and broken out frequently . . . carry fluids at high pressure with lots of vibration. The WECO Fig. 400 Union withstands more abuse in these tough services than any other union. Thicker sub end walls resist distortion . . . provide greater strength with less weight. The famous Weco ball and cone seat assures a perfect seal, every time.

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elev. 475 ft., Paluxy 5,822 ft., Glen Rose 6,130 ft., James 8,358 ft.

Navarro County: Frazier & Echols 1 J. V. Bounds, HT&B Sur., A-415, dry, TD 3,515 ft.

A. E. Roscoe 1 Viola Banner, T. J. Chambers Sur., A-1, dry, TD 645 ft.

Shelby County: Atlantic Refining Co. 1 Frost Lumber Co., E. E. Cooey Sur., A-143, dry, TD 8,300 ft., elev. 324 ft., James 7,070 ft., 3-Finger 7,355 ft., Travis Peak 7,983 ft.

Oklahoma

Pottawatomie Discovery Produces Gas-Distillate

SUBSTANTIAL gas-distillate production has been established in T. T. Eason & Co.'s wildcat, 1 Anderson, NE SE SW 3-11n-2e, a mile northeast of McLoud, in northwestern Pottawatomie County, near the Lincoln county line. Initial flow through open tubing was at the rate of 29,000,000 cu. ft. of gas and 300 bbl. of distillate per day. On a later 2-hour test through ⅜-in. choke, the well made 25 bbl. of distillate with gas at the rate of 3,286,000 cu. ft. per day. Pressure was 1,850 psi. on the tubing and 1,950 psi. on the casing. Production is from Misener sand, opposite which casing is perforated at 5,568-74 ft. Top of the Misener was called at 5,442 ft. Base of the Misener and top of the Hunton was called at 5,575 ft. Hole had been carried to 5,675 ft. After the above 2-hour flow, the well was shut in.

A new Prue sand reservoir, located 5 miles south of Pawnee, in southwestern Pawnee County, has been opened by Harry J. Schafer and associates at their 1 Meeker, SE SE SE 33-21n-5e. From pay in open hole at 3,110-29 ft., the well flowed 250 bbl. of oil in 5 hours through open tubing, and 11 bbl. of oil per hour when placed on 5/16-in. choke. The discovery is about 1½ miles southwest of the North Bryan pool, nearest other production. The latter pool produces from Red Fork sand.

F. P. Schonwald and Allie P. Reynolds have a two-zone discovery 8 miles northwest of Cushing, in Payne County, at their 1 Pratt, NE NE SW 29-19n-5e. From Misener sand in open hole at 3,748-56 ft., the well flowed at the rate of 5,200,000 cu. ft. of gas with 15 bbl. of distillate per day. Later, testing Red Fork sand, opposite which casing is perforated at 3,379-94 ft., it flowed an average of 10 bbl. of oil per hour for 24 hours.

K. A. Ellison is continuing production tests at his Bromide discovery well, 1 Tankersley, in northern McClain County. The well, located in the C NE NW 25-8n-4w, was flowing fairly steadily at 7 bbl. of oil per hour through 15/64-in. choke at latest report, after declining from an initial flow of 10 bbl. per hour. Pay is open through casing perforations at 10,450-90 ft. with top of the Bromide at 10,444 ft. Total depth is 11,308 ft. Location is 1½ miles north of the one-well Blue Hill pool, and several miles west of production in the Washington area.

About 1¼ miles northwest of the Ellison discovery, Jay Simmons has an indicated Hunton lime discovery well at his 1 Wilson, SE SE SE 14-8n-4w, but is drilling ahead for a look at lower horizons in the Simpson section. A drill-stem test in the Hunton at 9,284-9,334 ft. got 2,160 ft. of oil and gas-cut mud with 30 ft. of free oil. Top of the Hunton was logged at 9,275 ft.

OKLAHOMA SUCCESSFUL WILDCATS

Atoka County: Howell H. Vaughn 2 School Land, C NW NW 26-1n-14e, pumped 10

bbl. of oil from sand 390-487 ft., TD 487 ft.

Texas County: Cities Service Oil Co. 1 Morse "A," NW NW SE 24-5n-12eCM, flowed 13.3 M.c.f. of gas from 2,590-2,632 ft., TD 4,091 ft.

OKLAHOMA WILDCAT FAILURES

Garvin County: The Texas Co. 1 Thompson, SW SE SW 33-2n-1e, dry, TD 5,638 ft.

Wolfe Drilling Co. 1 Smith, NE NE SW 2-4n-2e, dry, TD 4,708 ft.

Kingfisher County: Camco Oil Trust (Boston) 1 Parrington, NW NW NE 14-15n-8 w, dry, TD 10,140 ft.

Lincoln County: North American Petroleum 1 Goggin, NE NE NE 22-13n-2e, dry, TD 5,481 ft.

Pawnee County: Camtex Oil Corp. 1 Lizar, NE NW NE 35-21n-6e, dry, TD 3,225 ft.

Camtex 2 Lizar, SE NW NE 35-21n-6e, dry, TD 2,760 ft.

J. R. Porter et al 1 Gilchrist, SW SW SE 5-22n-4e, dry, TD 3,690 ft.

The Hefner Co. 1 Warren, NE SE NE 14-23n-4e, dry, TD 3,809 ft.

Woodward County: Carter Oil Co. and Sinclair Oil & Gas Co. 1 Phillips, NE SE NW 17-21n-20w, dry, TD 10,393 ft.

California

New Foothills Tests To Start Near Pleito Creek

LOS ANGELES.—Richfield Oil Corp. was preparing to start two new wildcats near Pleito Creek field, in the foothills on the southern edge of San Joaquin Valley. Both are scheduled to drill below 11,000 ft. to test the Eocene. The company had a third test already under way and abandoned a fourth.

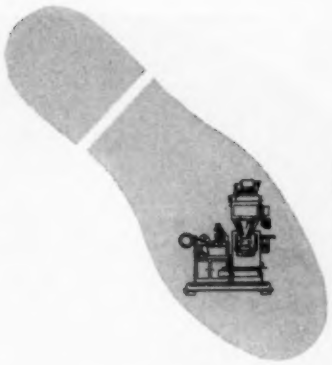
The new wildcats were Richfield 1-D San Emidio in 11-10n-21w, 2 miles south of Pleito Creek production, and 1-E San Emidio in Section 7. In SW 36-11n-21w, about ½ mile east of Pleito Creek and 2½ miles southwest of Wheeler Ridge-Eocene production, 1-B San Emidio was drilling below 9,000 ft. The company's 1-C San Emidio in 28-10n-20w, 6 miles south of Wheeler Ridge, was abandoned at 5,193 ft.

In the Rio Bravo field, Union Oil Co. shortly will start a deep wildcat to test Eocene zone possibilities. Site for the test has not been announced but it probably will be in 34-28s-25e. Deepest nearby test drilled to date was Superior Oil Co. 1 Helbling in 1-29s-25e, on the southeast end of Rio Bravo. It was abandoned in 1939 at 14,018 ft. in the Jurassic.

The two deep-zone tests in North Coles Levee and Paloma, where the Eocene lies at considerably greater depths, were continuing to drill ahead. Ohio Oil Co. 72-4 K.C.L.A. in 4-38s-26e was below 17,100 ft. and had reached the rank of the third deepest test drilled in California. At Coles Levee, Richfield 67-29 C.L.A. in 29-30s-25e, was below 10,100 ft., or approximately half of its scheduled depth.

Near Blackwells Corner in northwest Kern County, The Texas Co. in the next few weeks will start 2 Occidental (NCT-2) in 31-26s-19e. Last year the company drilled two failures on the large Occidental Land & Development Co. holding; one 7 miles southeast of the new location and the other 9 miles north.

The Graham pool area in Edison field received its first setback when a southern extension attempt was abandoned at 7,023 ft. The failure was Stansbury-Webb 81 Porter in NE NE 17-30s-29e, ½ mile south of the Pyramid Hill sand discovery of Crown



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Drilling Co. and about 1 mile southwest of the Pyramid Hill and Vedder sand discoveries of General Petroleum Corp. The latter's 27-9 Graham, in SW SW Section 9, halted drilling at 6,293 ft. to run an electrical survey.

About 1 mile west of Edison Groves production, Richard S. Rheem, operator, had moved in equipment for 81-A Kearney in NE NE 31-29s-29e. Another test getting under way was Superior Oil Co. 57-29 Weber in SW SE 29-15s-17e, ½ mile north of San Joaquin field in Fresno County.

In the northern valley gas area a development was the addition of a new producing zone in Chowchilla field, Madera County. The discovery was Tide Water Associated Oil Co. 1-7 Redman-Stone, completed flowing 5,000 M.c.f. of gas daily from 2,776 ft. The company contemplates drilling four additional wells in the area during 1953.

CALIFORNIA SUCCESSFUL WILDCAT

Madera County, new gas pool in Chowchilla field: Tide Water Associated Oil Co. 1-7 Redman-Stone, SE SE 7-10s-14e, flowed 5,000 M.c.f. rate, 1-in. bean, 940 psi. casing pressure, TD 2,776 ft., elev. 156 ft.

CALIFORNIA WILDCAT FAILURES

Fresno County, Camden area: Steele Petroleum Co. 1 Steele Pet.-Ormond, 27-17s-20e, dry, TD 7,837 ft., elev. 245 ft.

Coalinga area: J. B. Quinn 1 Griffith, 35-20s-14e, dry, TD 651 ft., elev. 1,366 ft.

Kern County, Edison area: Stansbury-Webb 81-17 Porter, 17-30s-29e, dry, TD 7,023 ft., elev. 553 ft.

Salt Creek area: Richfield Oil Corp. C-1 San Emidio, 28-10n-20w, dry, TD 5,193 ft., elev. 2-412 ft.

Tejon area: Continental Oil Co. S-2 KCL,

(Continued on page 222)

—"on guard at your well!"

MAC - 28
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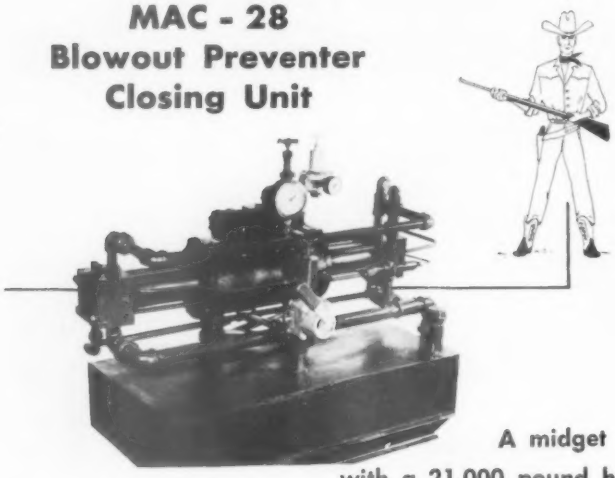
Closing Unit



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Kansas

Pawnee County Wildcat Gets Good Oil Recovery

AN exceptionally promising oil discovery for the Central Kansas Uplift appears to have been made by Westgate-Greenland Oil Co. at its 1 Smith, SE SE SW 22-22s-15w, 8 miles southeast of Larned, in southeastern Pawnee County. In a 60-minute drill-stem test at 3,958-76 ft. in the top of the Arbuckle lime, the well filled 3,340 ft. of oil and 60 ft. of gas-cut mud. With hole deepened to 3,988 ft., another test from 3,978 ft. got 3,720 ft. of grassy oil. Bottom-hole pressure was 1,400 psi. Previously, the well had recovered 160 ft. of oil-cut mud in a 60-minute test of Lansing lime at 3,663-3,708 ft. Hole has been drilled to 4,013 ft. and casing run for completion. Location is more than 6 miles from nearest other production on the west side of the uplift.

Sterling Drilling Co. is opening another oil reservoir in the general Smolan area of Saline County at its 1 Miller, NE SE SW 32-15s-3w, which produced at the rate of 6 bbl. of oil per hour during swabbing tests. The well, located a mile north of the Salemsborg pool, may be an extension of that pool. It is approximately 2 miles east of nearest production in the Smolan field proper. Pay is the Ordovician Maquoketa dolomite, topped at 3,391 ft. with surface elevation of 1,311 ft. The well is being put on the pump for completion.

Jones, Shelburne & Farmer's new discovery well, 1 Frazier, NW NW SW 33-9s-21w, in southeastern Graham County, has been completed on the pump making 391 bbl. of oil per day. Production is from Arbuckle lime, topped at 3,904 ft. and open below 3,905 ft. to 3,914 ft. (total depth). Location is a mile northeast of the Smith-Denning pool, nearest other production.

Buick Drilling Co. has casing run to test oil showings encountered in its 1 Matz, NE NE SW 33-20s-11w, a wildcat in the extreme southeastern part of Barton County and just north of the Stafford county line. Showings were in Lansing lime, cut at 3,125 ft. A 45-minute drill-stem test at 3,160-3,200 ft. got 1,100 ft. of gas and 300 ft. of heavily oil-cut mud. Hole was deepened to 3,530 ft., getting the conglomerate zone at 3,376 ft., without additional showings of consequence. Location is about a mile east of the Kowalski pool.

A new gas-producing area has been opened 8 miles northeast of LaCrosse, in Rush County, with the completion by Morrison Drilling Co. of its 1 Reichel, SW NW NE 23-17s-17w, flowing 6,825,000 cu. ft. per day from casing perforations in Lansing lime at 3,393-3,411 ft. and 3,419-29 ft. Bottom of the hole is at 3,476 ft. in granite, topped at 3,465 ft. Location is 1½ miles northeast of the abandoned Bison gas area, and 5 miles northwest of the Otis gas area, on the Rush-Barton county line.

KANSAS SUCCESSFUL WILDCATS

Ellis County: Victor Drilling Co. and Deep Rock Oil Corp. 1 Dreiling, SE SE SE 6-14s-16w, pumped 9 bbl. of oil from Arbuckle 3,472-80 ft., TD 3,480 ft. (opens Victoria pool).

Ford County: M. B. Armer 1 Helmers, NE NE SE 25-28s-21w, flowed 5.6 M.c.f. of gas from Mississippian 5,024-40 ft., TD 5,175 ft.

Kingman County: W. E. Green 1 Brand, NE NE SE 16-29s-7w, pumped 211 bbl. of oil from Mississippian 4,511-14 ft., TD 4,666 ft. (opens Basil pool).

KANSAS WILDCAT FAILURES

Cowley County: Martin & Cash 1 McClure,

Change the Rubbers and Save the Piston

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SW SW NE 35-34s-4e, dry, TD 3,216 ft.

Ellis County: Lee Phillips 1 Miller, SE SE SW 15-12s-17w, dry, TD 3,705 ft.

Murphy 1 Pfeifer, SW SW SW 18-13s-16w, dry, TD 3,563 ft.

Lyon County: Ben Brack 1 Jett, NW NW NW 27-18s-12e, dry, TD 2,725 ft.

Reno County: Virginia 1 Fredrick, SW SW SW 8-23s-4w, dry, TD 4,120 ft.

Saturn 1 Hodgins, NE NW NE 4-26s-10w, dry, TD 4,370 ft.

Rooks County: Doley 1 Conger, C N½ N½ N½ 9-10s-16w, dry, TD 3,514 ft.

Saline County: Franco Central 1 A. Malmgren "A," NE SE NE 22-16s-4w, dry, TD 3,600 ft.

Sheridan County: Anschutz 1 Gassman, SE SE SE 28-10s-29w, dry, TD 4,590 ft.

Stafford County: Westgate-Greenland 1 Taylor, SE NW SW 14-23s-14w, dry, TD 4,023 ft.

National Cooperative Refining Association 1 McCune "B," NW SW SW 4-25s-12w, dry, TD 4,217 ft.

Wabaunsee County: Continental Oil Co. 1 Falk, SW SW NW 23-13s-8e, dry, TD 2,400 ft.

EASTERN NEBRASKA WILDCAT FAILURE

Richardson County: Western Central 1 Stauffer, C SW NW 22-1n-13e, dry, TD 2,019 ft.

Rocky Mountain

Williston Interest Centers In Bottineau County Area

DENVER.—Current Williston basin interest centers on the Turtle Mountain area of Bottineau County, North Dakota where Ward Williston Drilling Co. of Bismarck reported recovery of 120 bbl. of oil in 1 hour from 1 Gorder, C. NW NW 35-163n-80w. The wildcat was acidized from 3,244-75 ft. and while attempting to swab, the operator stuck swab in hole, and pulled loose. During fishing operations the well flowed outside casing at the rate of 80 bbl. of oil in 30 minutes, then 40 bbl. during a second 30 minutes. The flow died at the end of an hour. The operator will recement casing, perforate and test. Casing shoe failed and the hole filled with sand and water after the flow of oil stopped. Some little delay in obtaining gage at the wildcat is expected.

The flow of 120 bbl. per hour is the best yet reported from this eastern producing area of the basin, and has added to already high interest in the prospects in the district.

At other wells in the area activity continues with fair to inconclusive results. Holbert Drilling Co. is pumping at the rate of 15-16 bbl. of fluid daily at 1 Ekrehagen, C NE SE 9-163n-77w. Recovery includes varying amounts of water according to the operator. At the discovery well this area, 1 Berentson, C SW SE 12-163n-80w, Brooks-Smith are pumping at the rate of 13-16 bbl. of oil daily, with tests not yet conclusive.

In Montana California Canadian & Gateway Oils, Ltd., reported shows of oil in fractured lime cores from their 1 Cedar Creek-Government, NE NE SW 24-12n-56e, in Prairie County, about 1½ miles northwest of Shell Oil Co.'s Pine Unit discovery, and just outside the unit area. Drill-stem test of the interval 7,833-70 ft. made only brackish water. These shows are considerably higher than the producing interval in Pine Unit, and are similar to upper shows found in early wells drilled within the unit by Shell. This area is regarded by many operators in eastern Montana as one of the most promising of Williston basin prospects opened in the state.

Continental Oil Co. announced intention to drill a Devonian-Ordovician test to about 8,600 ft. on its North Nihill block northwest of Harlowton, Wheatland County. This location will follow detailed geophysical work through the area, and is of interest since it is west of the majority of deep drilling through the general central Montana area. Cities Service Oil Co. and Northern Pacific Railway Co. also have interests in the block.

Cities Service announced location for another in its series of wildcats through central Montana, with a wildcat, 1 Kempf, C SW NW 27-4n-33w in the Custer area of eastern Yellowstone County.

In the Poplar Unit, Roosevelt County, C. H. Murphy, Jr. reported recovery of oil from Heath at 13 Unit, C NW NW 11-28n-51e. Test of the zone 4,891-4,904 ft. in this well recovered 390 ft. of clean, black, 39.6°-gravity oil, 180 ft. of oil-cut mud and 445 ft. of salty, muddy water.

Shows in this formation have been logged in several wells in the field, but previous tests have not been run. While the operator has announced no intention of attempting a completion in the formation in this well, the recovery if of interest as the first of possible commercial promise in Montana. The Heath is an upper member of the Big Snowy group of Mississippian age, and overlies Charles from the region of the Big Snowy and Little Belt mountains eastward for an undetermined distance into the Williston basin. Where sand members are present in the formation, the formation has been compared to the Springer. Production from Heath would be the first from a sand within the basin.

New interest in the northern Big Horn

YOUR U. S. A.

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basin of Wyoming was generated with test of Gulf Oil Corp.'s 1 Emmett, C SW SW 13-52n-94w, west of the town of Greybull, Big Horn County. The well unloaded more than 3,000 ft. of oil and some mud and mud-cut oil from pipe was being pulled following test of the zone 9,680-9,725 ft. Test was in the Greybull sand. This formation is not a major producing horizon in the basin, but does produce about 5 miles east of the present wildcat in Greybull field. The Gulf well is 2¼ miles northeast of a discovery in this formation by Trigood Oil Co. of Casper which was completed in 1952 for a gage of 2,000 M.c.f. of gas per day, with 40 bbl. of distillate per million. Gulf is attempting to run another test on the wildcat which is a scheduled 12,000-ft. test to Madison.

On the east side of the Powder River basin True, Brown, Fulton, Gower & Winegar of Casper and Denver are swabbing at 1 Stephenson, C NE SW 5-49n-69w, where recovery of 50 per cent oil-cut mud from Dakota sand was logged several days ago. Results of swab tests have not been announced. The well, if a success will become the first producer in Crook County.

Unconfirmed reports of recovery of saturated cores from Ohio Oil Co.'s 1 Pellett, SE SE SW 20-9n-18w, 18 miles west of the town of Kearney in Buffalo County, Nebraska have focused new interest farther eastward in Nebraska, and started a definite lease play through the area. The well is third in a series of slim-hole stratigraphic tests drilled through the area by Ohio. No information is released by the operator.

Ohio has done considerable seismic work through this section of Nebraska and has extensive holdings on the west side of Buffalo and the east side of Dawson counties. Ohio

(Continued on page 222)

Central Area

ILLINOIS

St. Louis lime has been added to the many producing horizons of the New Harmony field with the completion by Superior Oil Co. of its 8-C Ford, SW SW SE 27-4s-14w, White County. The well also is completed in Salem lime, another recently opened pay zone for the field. It is second well in the field to produce from the latter zone. Initial production from both zones was 75 bbl. of oil per day on the pump. Location is 330 ft. southeast of the Salem discovery well, 17-C Ford, completed last year by the same company. Both wells are old McClosky lime producers deepened.

The newly completed well is open in St. Louis lime at through casing perforations at 3,143-53 ft., and in Salem lime at 3,749-94 ft. (total depth). Completion follows a long series of tests through the two horizons.

Morrison & Hall and associates are completing a good producer on the west side of the Albion field, in the area a half mile north of Albion, in Edwards County. It is their 1 Smith-Utley, NW NE SE 36-1s-10e, which swabbed and flowed at the rate of 600 bbl. of oil per day while testing Aux Vases sand at 3,132-63 ft.

INDIANA

John P. Washburn is extending production of the Oatsville field to the north at his 2 Robling, SW NE SE 11-1s-9w, now being completed on the pump as good for approximately 100 bbl. of oil per day from Rosiclare lime at 1,610-17 ft. Total depth is 1,640 ft. Location is 6 miles southwest of Petersburg, in northern Pike County.

About 3½ miles to the northwest, in the Union-Bowman field, F. L. Beard & Sons 1 Campbell, SW SE SE 32-1n-9w, same

county, swabbed and flowed 106 bbl. of oil in a 6-hour test of Aux Vases sand at 1,628-32 ft. and Rosiclare lime at 1,649-53 ft., and is being put on the pump for completion.

F-B Drilling Co. and Ralph Halbert are completing another good producer in the new extension area on the east side of the Griffin field, 3 miles west of the town of Griffin, in Posey County. It is their 2 Glaze, SE NW SE 3-4s-14w, which swabbed and flowed 20 bbl. of oil per hour in tests of Aux Vases sand at 2,820-50 ft.

WESTERN KENTUCKY

William Styles has plugged back at his 1 Gabbert, Devonian wildcat test, located 4 miles northwest of Stanley, in the extreme northwest tip of Daviess County, and will attempt to make a well in O'Hara lime. The well was drilled to 3,739 ft. in Devonian, topped at 3,508 ft. It had a show of oil and gas at 3,600-09 ft. in that zone, but this was not considered of commercial extent. O'Hara lime showings were logged at 1,810-16 ft. A 60-minute drill-stem test of the zone got 10 ft. of oil and 60 ft. of oil-cut mud without water. Oil-string has been run through this prospective pay to 2,300 ft. Location is northwest of production of the new Raccoon Pond pool.

EASTERN KENTUCKY

In the Pike County sector of Big Sandy gas field, United Fuel Gas Co. has completed a good gas well at their 8039 G. C. Rowe. An initial open flow potential of 3,130,000 cu. ft. of gas daily was assigned to the well with a 24-hour rock pressure of 595 psi. Producing formation is the Maxon (Mississippian) sand topped at 2,303 ft. and paying from 2,303-11 ft. and from 2,319-31 ft. Total depth was 2,333 ft. Well was brought in natural.

Also in Pike County, same company finaled 5538 Kelsie Childers et al as a Devonian black shale well. Test was a deepening from an old total depth of 2,620 ft. in the Big lime to a new total depth of 4,145 ft. in the black shale topped at 3,350 ft. This was also a natural completion, the well gaging 747,000 cu. ft. of gas daily.

MICHIGAN

Pure Oil Co. had a Traverse oil pay at its 1 Brown, NE NW NE 31-20n-6w, Winterfield Township, Clare County, a well being drilled in Winterfield pool which is scheduled to be carried to the Richfield oil pays. Well logged Traverse lime at 3,080 ft. First gas showed in the upper Traverse at 3,082-88 ft. In the lower (second Traverse) a gas pay was drilled at 3,122-27 ft. which was gaged at 675,000 cu. ft. a day. The oil show, accompanied by water, was logged at 3,251 ft. After 7-in. casing was set at 3,333 ft., well flowed from between the 7-in. and 8-in. casing at the rate of 20 bbl. of fluid in 20 hours. Well was continuing to head up and flow at the 1 bbl. an hour rate as drilling was being continued below 3,434 ft. About 50 per cent of the fluid showing on these flows from between the casing strings out of the Traverse was reported to be oil. Well is scheduled to penetrate the Richfield at about 5,100 ft.

C. F. Parkinson 1 Schneider, C SE 18-5n-17e, St. Clair Township, St. Clair County, a probable new basal Salina-Niagaran gas discovery, was being tested this week after new acid treatments with 500 and 4,000 gal. Well, bottomed out at 2,572 ft., showed as much as 365,000 cu. ft. of gas a day from pay at 2,566-69 ft. before being acidized. First two acid treatments appeared to have killed the gas flow. Water was used in these treatments and this water was believed to be the cause for gas not showing at their conclusion. Within 15 minutes after the next 500-gal. acid shot, well showed for 395,000 cu. ft. of gas a day. Following the 4,000-gal. treatment, well was gaged at 1,200,000 cu. ft. a day within 2½ hours. Top gage, after 3 hours and 10 minutes, was 1,350,000 cu. ft. Well will be reacidized.

ILLINOIS WILDCAT FAILURES

Christian County: A. M. Branyan et al 1

(Continued on page 229)

Appalachian-Ohio

OHIO

The 1 John Morrow et al found indications of a new oil pool 1¼ miles east of the old field in Perry Township, Coshocton County. The test, on 1 S. D. Conard, Section 13, logged the Clinton at 3,268-3,319 ft., and made 19 bbl. in 24 hours after shot.

A gas discovery was brought in by G. L. Reasor et al on 1 F. P. Beery, Section 33, Falls Township, Hocking County. Clinton sand at 2,690-2,710 ft. gaged 500,000 cu. ft. natural, and an estimated 1,000,000 cu. ft. after a 90-qt. shot.

The new gas pool in Newton Township, Muskingum County, was extended a location to the east by Ohio Fuel Gas 1 L. H. Carrell, Section 23. The Clinton was found at 3,540-87 ft. with 250,000 cu. ft. natural and 750,000 cu. ft. when shut in after shot.

Pure Oil Co. 1 W. Bucklew, 1st. Qr., New Castle Township, Coshocton County, made a good showing of oil natural in Clinton at 3,062-3,119 ft. The test was Hydrafraced, and in 6 days flowed 110 bbl.

PENNSYLVANIA WILDCAT FAILURE

Centre County: Keta Gas & Oil Co. 1 City of Philadelphia, dry, TD 8,330 ft.

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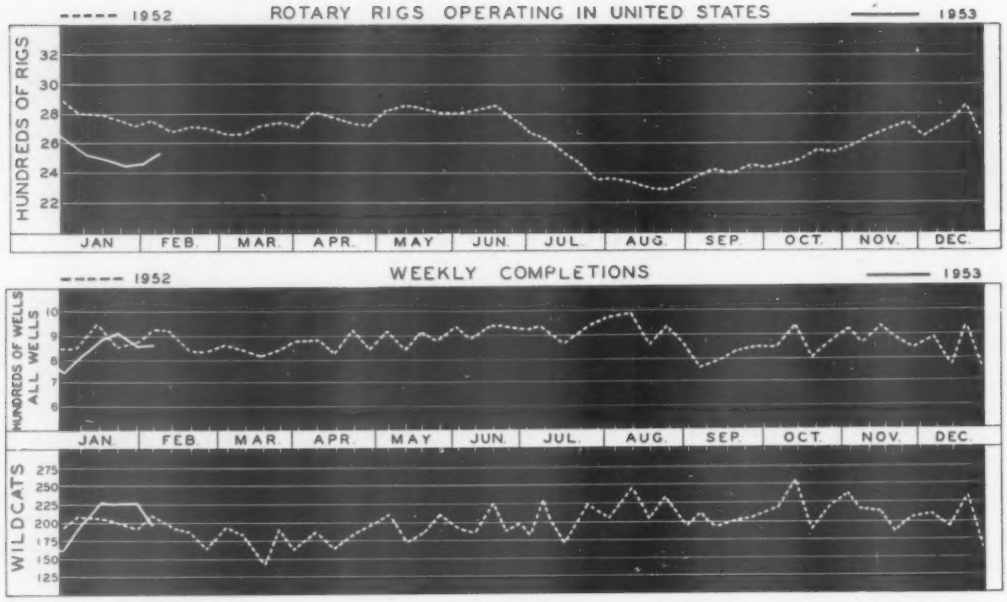
Distributor: Allied Services, Inc., Mt. Pleasant, Michigan Telephone: 29-861

Foreign: D. T. O'Connor, 500 Fifth Avenue, New York, N. Y. Petroleum Industry Consultants, C. A., Caracas, Venez. Denton-Spencer Co., Ltd., Calgary, Alberta, Canada

THE OIL AND GAS JOURNAL

"Now, when this guy with the checkered suit comes in—don't interrupt, Miss Bell—offer him five at first and go to twenty thousand if you have to."



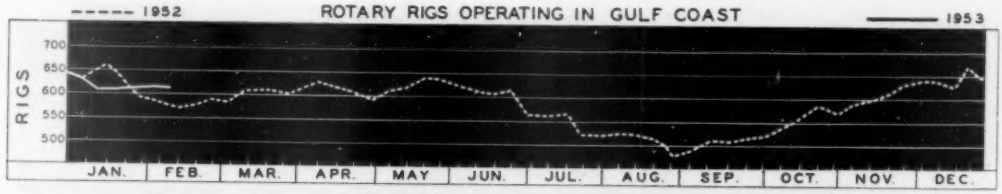
CURRENT STATISTICS

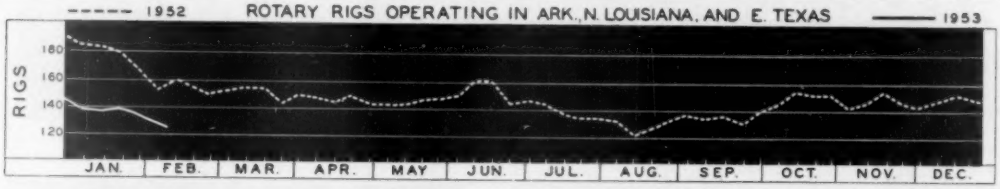
EXPLORATION

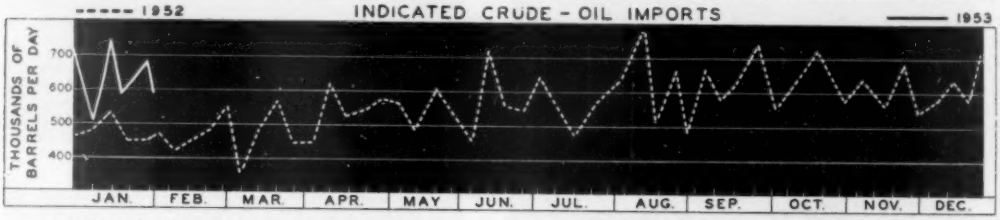
WEEKLY WELL COMPLETIONS . . . WEEK ENDED FEBRUARY 7, 1953

	Total of all wells					Feb. 7		Wildcat completions and discoveries					Cumulative total, 1953				
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	13	7	0	*6	21,810	71	57	0	0	0	0	0	0	0	0	0	0
Pennsylvania	32	15	3	†14	53,920	176	162	0	0	0	1	1	0	0	2	5	7
West Virginia	16	1	8	7	45,712	53	57	0	0	0	0	0	0	0	0	0	0
Ohio	20	11	1	8	44,762	96	99	0	0	0	0	0	0	0	0	1	1
Indiana	11	6	0	5	21,528	157	133	0	0	0.	1	1	5	0	1	28	34
Kentucky	21	3	10	8	50,574	117	139	0	0	0	3	3	4	0	1	19	24
Illinois	39	22	0	17	100,500	213	193	0	0	0	6	6	1	0	0	39	40
Michigan	5	1	0	4	8,264	70	52	0	0	0	4	4	4	0	1	26	31
Kansas	84	43	6	‡35	294,635	454	563	2	0	1	12	15	13	0	3	86	102
Nebraska	4	0	0	4	15,850	31	31	0	0	0	2	2	0	0	0	14	14
Oklahoma	107	71	6	30	410,596	657	687	1	0	1	9	11	7	2	3	70	82
Texas	339	170	21	148	1,617,898	1,597	2,015	20	2	3	80	105	90	12	18	424	544
North Central (Dist. 7-B & 9)	108	51	0	57	382,103	526	629	11	0	0	29	40	46	0	3	169	218
West (Dist. 7-C & 8)	78	52	2	24	403,746	379	638	4	0	0	11	15	14	1	0	73	88
Panhandle (Dist. 10)	27	19	5	3	119,879	81	75	0	0	0	0	0	0	2	0	6	8
Eastern (Dist. 5 & 6)	16	3	4	9	87,429	71	85	0	0	0	5	5	1	0	0	27	28
Gulf Coast (Dist. 2 & 3)	45	21	2	22	291,505	250	320	4	1	1	13	19	17	1	6	68	92
Southwest (Dist. 1 & 4)	65	24	8	33	333,236	290	268	1	1	2	22	26	12	8	9	81	110
Louisiana	54	30	4	20	395,875	279	263	1	0	1	7	9	8	1	3	36	48
Northern	20	10	2	8	84,053	131	140	0	0	0	3	3	1	0	0	18	19
Southern	34	20	2	12	311,822	148	123	1	0	1	4	6	7	1	3	18	29
Arkansas	7	2	1	4	25,087	49	43	1	0	0	2	3	2	0	0	11	13
Mississippi	6	3	0	3	35,784	44	53	0	0	0	2	2	4	0	0	19	23
Southeastern States	3	1	0	2	14,255	15	6	0	0	0	2	2	1	0	0	12	13
Montana	1	0	0	1	2,548	39	12	0	0	0	1	1	0	0	0	8	8
Wyoming	6	5	0	1	34,177	56	59	0	0	0	0	0	1	0	0	13	14
Colorado	14	3	1	10	72,178	59	49	1	0	0	9	10	1	0	1	38	40
Utah	0	0	0	0	0	7	3	0	0	0	0	0	1	0	0	4	5
New Mexico	15	7	3	5	73,720	129	92	0	0	0	2	2	3	0	1	15	19
California	58	39	1	18	250,710	254	254	0	0	1	16	17	3	0	1	63	67
North Dakota	6	3	0	3	53,718	26	0	0	0	0	2	2	0	0	0	9	9
Miscellaneous	0	0	0	0	0	7	10	0	0	0	0	0	0	0	0	5	5
Total United States	861	443	65	353	3,644,101	4,656	5,032	26	2	7	161	196	148	15	35	945	1,143
Total previous week	855	427	53	375	3,572,366			28	5	9	184	226	122	13	28	784	947
Total February 9, 1952	917	521	65	331	3,798,568			25	2	4	164	195	145	13	26	957	1,141

Service wells included: *6, †11, ‡1.



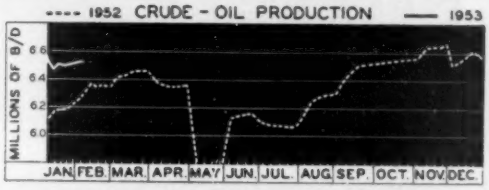


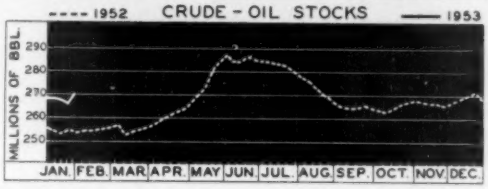


DAILY AVERAGE PRODUCTION FOR WEEK

	February 7, 1953			Jan. 31
	Crude oil	Lease condensate	Total	total
Alabama	4,100	.....	4,100	3,900
Arkansas	77,350	650	78,000	77,800
California	993,400	.....	993,400	993,500
Colorado	85,600	.....	85,600	87,000
Eastern	54,500	.....	54,500	54,800
Florida	1,550	.....	1,550	1,550
Illinois	165,900	.....	165,900	164,300
Indiana	34,400	.....	34,400	34,400
Kansas	334,300	.....	334,300	345,200
Kentucky	30,200	.....	30,200	30,400
Louisiana	658,450	38,400	696,850	688,225
North	109,800	2,400	112,200	112,400
South	548,650	36,000	584,650	575,825
Michigan	35,300	.....	35,300	36,200
Mississippi	92,050	4,550	96,600	96,800
Montana	28,200	.....	28,200	28,500
Nebraska	12,900	.....	12,900	13,100
New Mexico	178,825	625	179,450	178,550
Oklahoma	529,800	.....	529,800	528,400
Texas	2,889,525	50,425	2,939,950	2,921,750
Dist. 1	36,500	250	36,750	37,350
Dist. 2	161,475	6,000	167,475	166,700
Dist. 3	471,750	25,700	497,450	499,450
Dist. 4	261,100	6,000	267,100	263,750
Dist. 5	51,850	400	52,250	52,875
Dist. 6	125,900	6,000	131,900	130,800
East Texas field	259,900	.....	259,900	262,500
Dist. 7-B	111,400	100	111,500	111,900
Dist. 7-C	174,050	5,100	179,150	176,025
Dist. 8	971,800	350	972,150	952,625
Dist. 9	187,800	500	188,300	188,000
Dist. 10	76,000	25	76,025	79,775
Utah	5,300	.....	5,300	5,100
Wyoming	217,400	.....	217,400	216,900
North Dakota	11,200	.....	11,200	11,000
Total U. S.	6,440,250	94,650	6,534,900	6,517,375
Change from previous week			up 17,525	
Canada	122,225	.....	122,225	179,600
Total U. S. production January 1-February 7				247,263,875 bbl.
Same period last year (crude plus cond.)				237,362,305 bbl.

*Includes 3,623,935 bbl. condensate.



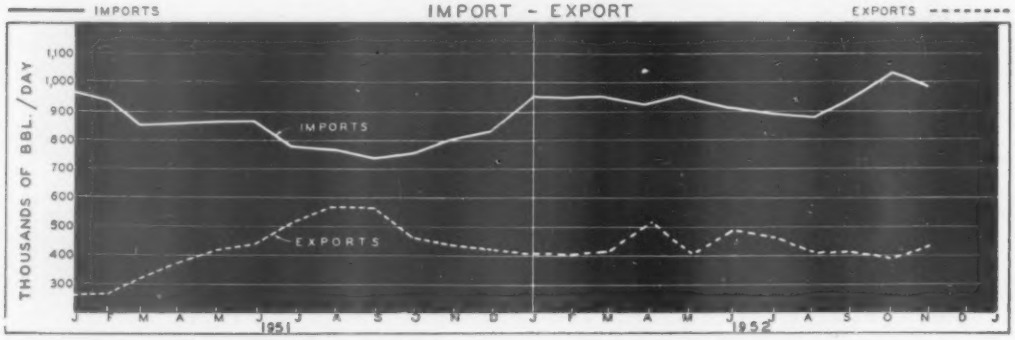


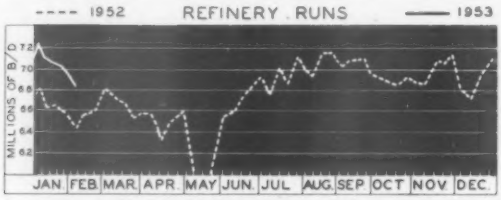
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

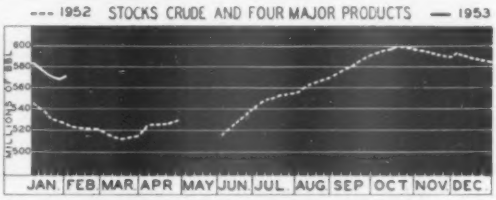
(Thousands of barrels)

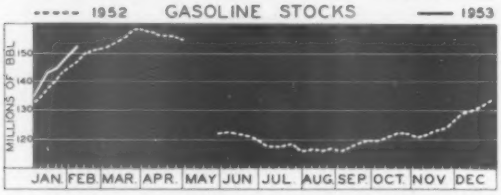
	Jan. 31, '53	Jan. 24, '53	Feb. 2, '52
Pennsylvania Grade	2,147	2,199	1,988
Other Appalachian	1,940	1,860	1,960
Illinois, Indiana, Michigan	9,829	10,356	11,303
Arkansas	3,176	3,271	2,895
Louisiana	15,364	15,194	13,756
North	2,515	2,446	2,762
Gulf	12,849	12,748	10,994
Mississippi	3,249	3,345	3,646
New Mexico	7,083	7,094	7,261
Oklahoma and Kansas	36,985	35,239	40,042
Texas	134,235	133,341	121,601
East Texas proper	11,169	11,273	10,616
West Texas	63,790	63,097	55,517
Texas Gulf	25,614	25,397	24,668
Other Texas	33,662	33,574	30,800
Rocky Mountain	15,127	14,497	13,358
California	33,108	32,098	30,534
Foreign	8,398	8,129	6,466
Total	270,641	266,623	254,810

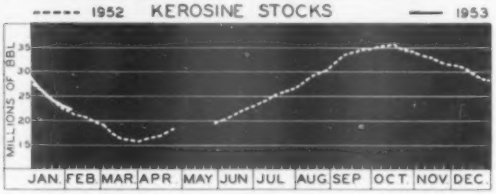
*Bureau of Mines

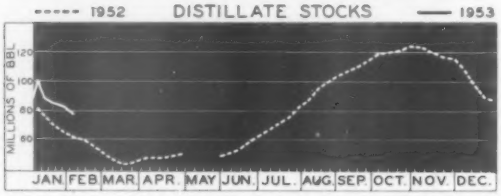


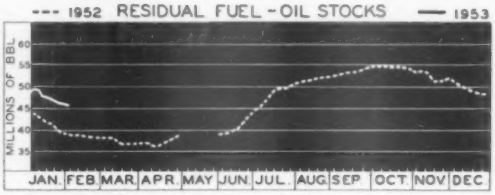










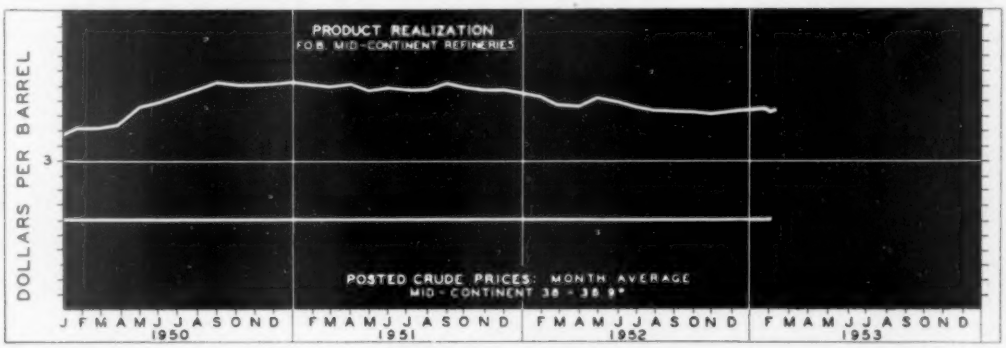


A.P.I. REFINERY REPORT, FEBRUARY 7

(Thousands of Barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, February 1952 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,021	449.3	44.4	258.7	237.6	34,186	9,918	29,362	12,173	973	383.9	41.5	252.4	245.5
Appalachian:														
District 1	117	44.3	10.0	15.7	19.0	4,368	516	1,362	671	109	45.1	4.7	19.3	15.0
District 2	96	48.1	7.1	16.4	14.6	1,825	316	533	158	82	39.1	5.1	14.0	20.2
Ind., Ill., Ky.	1,267	680.6	85.1	233.3	177.7	34,683	5,132	12,632	4,526	1,252	664.9	84.4	232.8	196.9
Okla., Kans., Mo.	585	352.9	10.4	137.9	53.6	17,041	1,167	8,491	1,197	556	310.6	13.6	134.5	68.4
Inland Texas	265	177.3	11.7	38.7	37.8	5,818	346	1,431	972	251	176.1	15.2	40.2	41.2
Texas Gulf Coast	1,639	753.7	128.7	402.1	260.8	20,906	2,245	8,281	6,510	1,645	740.0	137.9	421.3	255.8
La. Gulf Coast	504	242.0	58.1	121.0	48.1	7,799	1,426	3,323	1,449	530	214.6	49.0	154.8	60.3
N. La. and Ark.	87	34.4	8.0	24.4	8.9	3,100	533	936	81	79	35.5	7.2	20.4	6.8
Rocky Mountain:														
New Mexico	19	11.4		2.9	3.9	169		52	33	17	10.6	0.5	2.5	3.9
Other Rocky Mtn.	233	116.0	10.0	38.0	43.7	5,929	333	1,558	923	217	99.2	6.9	48.8	47.7
California	1,001	408.9	9.9	164.9	352.6	16,669	376	10,191	17,114	972	389.5	4.4	187.1	360.8
Feb. 7, 1953	6,834	3,318.9	383.4	1,454.0	1,258.3	152,493	22,308	78,152	45,807	6,673	3,109.1	370.4	1,528.1	1,322.5
Jan. 31, 1953	6,933	3,332.7	421.7	1,505.0	1,261.6	149,443	23,292	82,148	46,356	.....	.....	.....	.....	.....
Feb. 9, 1952	6,421	3,063.7	376.0	1,506.3	1,272.4	147,941	21,257	64,504	29,210	.....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.34 for week ended January 31, $3.31 for previous week, and $3.45 for January 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of February 11, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅛-10½	12.125-12.75	10¾-11
Premium gasoline, 86-88 octane	11¼-11½	13.25-14.0	11¾-12
42-44 w.w. kerosine	8½-9	10.65	9
No. 2 straw fuel oil	7½-8	9.65	8
No. 6 residual	$0.85-1.00	$2.00-2.15	$1.50-1.65

NATURAL GASOLINE

	Group 3	North Tex.	N. La.
Grade 26-70	6⅝	5⅞	6⅛
Grade 18-55	7.65	7.15	7.40

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	21-22
200 vis., No. 3 neutral, 0-10 pp.	12-13

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	27.5
180 vis., 0 p.t. neutral	29.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

THE towboat strike in some of the larger harbors of the northeastern states during the first week of February tended to increase primary stocks and drain secondary inventories at these points. Inability to move required material from primary to secondary storage has tended to eliminate under-the-market sales of kerosine and distillate fuels in New York Harbor.

Since almost all of the movement out of primary storage has been either by tank truck or by barges of the few major companies not included in the strike, sales have been to contract customers and prices have held at ceilings of 9.65 cents for No. 2 fuel and 10.65 cents for kerosine.

Reports from the Gulf Coast indicate that light fuels are readily available, and that all but top-quality gasolines are hard to move on the spot market.

The slight improvement in residual fuel in the Group 3 area in late December and early January is not holding for February. The normally quoted low for good No. 6 had moved up until it was ranging between 85 and 90 cents per barrel for the first half of January. Low-sulfur residual now is available in quantities at prices below 85 cents. Some moderate to high-sulfur fuel is moving at 75 cents or almost down to the level that existed early in the winter. Several jobbers in Chicago cut tank-wagon prices for residual by 0.25 cent a gallon.

Some of the larger shippers in the Great Lakes Pipe Line are cutting off tenders of kerosine and No. 2, based on an assumption that there is enough fuel in terminal storage to cover the needs for the season unless the weather for the next 6 weeks is very cold. Some have expressed opinions that even cold weather will not move all of the surplus distillate at refineries and terminals. Over 500,000 bbl. of light fuel was reported to be subject to demurrage on the Great Lakes line at the first of February.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif‡	Okla. homa, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93			
19-19.9	1.98			
20-20.9	2.03	$2.25		$2.12
21-21.9	2.07	2.27		2.14
22-22.9	2.12	2.29		2.16
23-23.9	2.18	2.31		2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico.

Last general price change represented a 50-cent increase, effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel. Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°.

California Fields

(Continued from page 212)

12-10n-20w, dry, TD 3,200 ft., elev. 1,380 ft.

Tunis Creek area: Standard Oil Co. 4 Tejon 3-Core-Hole, 32-11n-18w, dry, TD 2,388 ft., elev. 852 ft.

Wheeler Ridge area: Standard Oil Co. 356 Kern County Lease No. 2, 28-11n-20w, dry, TD 11,304 ft., elev. 1,915 ft.

Los Angeles County, Horse Meadows area: Union Oil Co. 1-46 Horse-Meadows, 3-2n-16w, dry, TD 5,005 ft., elev. 1,386 ft.

Potrero area: Basin Oil Co. of California 18 Potrero, 34-2s-14w, dry, TD 7,585 ft., elev. 159 ft.

Sierra Pelona area: W. I. Zidell 1 W.I.Z., 7-5n-13w, dry, TD 2,370 ft., elev. 2,975 ft.

Monterey County, Dutch Henry Canyon area: Western Gulf Oil Co. 1 Freeman-Pfyffer, 34-21s-10e, dry, TD 1,959.

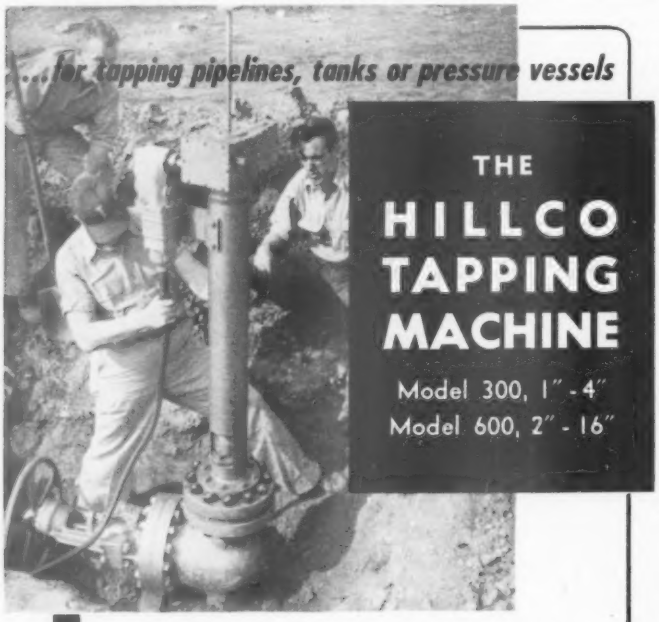
Orange County, West Newport area: H. C. Ramser and J. P. Sievers 1 Ramco, 12-6s-11w, dry, TD 2,522 ft., elev. 15 ft.

San Benito County, Panoche Valley area: Blinn-Aidlin 1 Carrol, 22-15s-10e, dry, TD 1,426 ft., elev. 1,304 ft.

San Benito area: Oceanic Oil Co. 1 Rudolph, 4-18s-9e, dry, TD 1,864 ft., elev. 1,717 ft.

San Luis Obispo County, Cuyama Valley area: C. W. Colgrove 42-A4 Russell, 4A-10n-26w, dry, TD 2,617 ft., elev. 2,145 ft.

Santa Barbara County, Elwood area: Signal Oil & Gas Co. 309-4 Signal-Honolulu-State, 19-4n-28w, dry, TD 10,072 ft., elev. 52 ft.



The HILLCO Tapping Machine is designed to tap high-pressure or high-temperature pipelines, tanks or pressure vessels (Oil, Natural Gas, Gasoline, or Water). For tapping through gate valves from 1" to 16" (Plug Valves 2" to 4". Special cutters are available for use with other valves having restricted openings). Larger sizes designed to operate with air motor. The HILLCO Tapping Machine is shop tested at 2000 p.s.i. for operation at 1000 p.s.i., and is also equipped with high-temperature packing.

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BEN W. BRUNDAGE COMPANY Oakland 11, California
LANGLEY Y CIA. Buenos Aires, Argentina
H. E. DAVIS Los Angeles, Calif.
JAMES S. KONE CO. Amarillo, Texas
KEYES TANK CO. Provo, Utah
KEYES TANK & SUPPLY CO. Casper, Wyoming
CANADIAN EQUIPMENT SALES & SERVICE CO., LTD. Edmonton, Calgary, Toronto, Canada

Rocky Mountain Area

(Continued from page 216)

is reported adding to holdings through the region.

The area is southeast of the general Chadron Arch elevation, and in the north end of the Salina basin. Possibilities of pinch-out type of stratigraphic traps in Lansing-Kansas City and Arbuckle formations is reported primary objective of the work done through the district.

In Weld County, Colorado, Twin Oil Co. is pumping at the 2 Cuykendall, NW NW SW 12-2n-63w, in the Roggen area. The well had considerable attention as the most centrally located discovery within the Denver-Julesburg basin to date. First tests recovered 123 bbl. of oil in 18 hours, and the operator has not reported a 24-hour pump gage. The well swabbed 15 bbl. of oil per hour on 4-hour swab test before pump was installed.

Northeast of Scottsbluff, Scottsbluff County, Nebraska, Colling Oil Co. perforated casing at 1 Baxter, C SE NW 14-22n-54w, and had a 2,700 ft. fill-up of water with a scum of oil. Operators recovered 20 ft. of oil on drill-stem test of the "J" sand in this well, and will squeeze and reperforate for further tests. There is at present no production in this county.

COLORADO SUCCESSFUL WILDCAT

Weld County: South Texas Development Co. 1 Derks, NW NW SE 17-8n-56w, pumped 26 bbl. of oil per day from 5,923-25 ft., Dakota 5,904 ft., TD 5,979 ft. PBTD 5,939 ft.

COLORADO WILDCAT FAILURES

Archuleta County: Locke-Taylor 1 O'Bannon, C E½ SE 14-36n-1w, dry, TD 4,050 ft.

Logan County: Kingwood Oil Co. 1 State, NE NE SW 36-9n-50w, dry, TD 4,449 ft. "J" sand 4,395 ft.

Harry Royster & Falcon Seaboard 1 Davis, C NE NW 32-9n-54w, dry, TD 5,325 ft. "J" sand 5,262 ft.

Herndon Drilling Co. 1 Stratton, NW NW NE 18-11n-50w, dry, TD 4,710 ft. "J" sand 4,647 ft.

Washington County: Eddie Fisher 1 McLean, SW SW SW 14-1s-56w, dry, TD 5,315 ft. "J" sand 5,115 ft.

Amerada Petroleum Corp. 1 Brown, NW NW NE 8-4s-50w, dry, TD 4,206 ft. Cloverly 4,146 ft.

Amerada 1 Payne, SE NE NE 13-4s-51w, dry, TD 4,155 ft. Cloverly 4,123 ft.

Weld County: Stout Oil Co. and Eddie Fisher 1 State, SE SE SW 16-7n-58w, dry, TD 6,645 ft. "M" sand 6,638 ft.

Ray Campbell 1 Gillette, C SE NE 3-9n-61w, dry, TD 7,362 ft., "J" sand 7,303 ft.

NEBRASKA WILDCAT FAILURE

Cheyenne County: The Chicago Corp. and Republic Natural Gas Co. 1 Schnell, NE NE SE 25-14n-49w, dry, TD 4,546 ft. "J" sand 4,493 ft.

NORTHERN NEW MEXICO WILDCAT FAILURE

San Juan County: Southern Union Gas Co. 1 Taliferro, NE SW SW 20-31n-12w, dry, TD 2,520 ft. Pictured Cliffs 2,415 ft.

MONTANA WILDCAT FAILURE

Fergus County: B&J Drilling Co. 1 Harri, W½ NW NW 8-12n-24e, dry, TD 2,548 ft. Madison 2,526 ft.

NORTH DAKOTA WILDCAT FAILURES

Slope County: Stanolind Oil & Gas Co. and Deep Rock Oil Corp. 1 Brusich, SE SE SE 8-135n-98w, dry, TD 11,152 ft., Red River 11,054 ft.

Ward County: Quintana Production Co. 1 Linnertz, C SW SE 33-156n-83w, dry, TD 8,934 ft. Red River 8,659 ft.

EQUIPMENT MEN . . . in the News

Broadus Assumes California Sales Duties for Union Wire

Joseph T. Broadus has been named state-wide representative for Union Wire Rope Corp. in California.

In 1937 Broadus joined the Union Wire Rope mill in Kansas City, and in 12 years became experienced in all phases of wire-rope manufacture. In 1949 he was transferred to the company's branch in Sacramento as warehouseman. In 1951 Broadus was recalled to the Air Force of which he was a reserve. Upon returning to the company in August 1952 he took a refresher course in the Union Wire sales training school, and assumed his California sales duties January 1.

Cardwell Names Downing To Rocky Mountain Sales

Cardwell Manufacturing Co., Inc., Wichita, has announced the appointment of L. L. Downing as its new Rocky Mountain sales representative.

Downing came to Cardwell from Baash-Ross Tool Co. where he was Kansas representative for that firm. Downing has spent most of his life in the oil fields, and he has considerable experience in all phases of drilling and production.

Oilwell Appoints Jacoby To Key Sales Position

The appointment of John W. Jacoby as manager of pump fluid end parts sales for U. S. Steel's Oil Well Supply Division has been announced by K. B. Winstead, general manager of sales.

Jacoby joined Oilwell in 1943 as a design engineer at Imperial Works, Oil City, Pa. He was made assistant to chief engineer in 1948 and the following year was transferred to the company's headquarters at Dallas as assistant to director of engineering.

In Dallas, Jacoby has supervised most of Oilwell's field research and development work, with special emphasis on expendable pump parts for both the piston-type slush pump and the triplex plunger pumps used for secondary recovery, salt-water disposal, acidizing, and cementing.

Promotions Announced By Mid-Continent Supply

Ken W. Davis, president of Mid-Continent Supply Co., Fort Worth, has announced the promotion of R. L. Harris as division manager of the company's Rocky Mountain division, and G. A. Metz as division machinery manager at Casper, Wyo.

R. L. HARRIS

G. A. METZ

Harris has been with Mid-Continent since 1946, and served in Fullerton, Odessa, Lubbock, San Angelo, and Kermit, Tex., before assuming duties in 1949 as district manager in Casper.

Metz joined Mid-Continent in 1946. He worked for the organization in Odessa and Fort Worth, Tex., and in Casper, Wyo., as district machinery manager before his recent promotion.

Bowen Appointed President Of S. R. Bowen Co.

PAUL BOWEN

Paul Bowen was recently appointed president of S. R. Bowen Co., succeeding the late Jack Wilcox.

Beginning in the company office in 1930, Bowen spent many years in the sales and service departments, and was store manager at Santa Maria, Calif., and Casper, Wyo. For the past several years he has been president of Bowen Fishing Tool Co., and vice president of S. R. Bowen Co.

Other executives of S. R. Bowen are Jim Wilcox and Dante Siracusa, vice presidents; S. Siracusa, treasurer, and Robert Allen, secretary.

New Reo Motors Division Headed by R. D. Jacobs

R. D. JACOBS

Activation of the industrial and marine engine division of Reo Motors, Inc., was announced recently by Joseph S. Sherer, Jr., president.

Formation of the new Reo division has been in the planning stages many months, Sherer said. The new division sales activities and engineering developments will be headed by R. D. Jacobs, II. Jacobs joined Reo in 1951 to assist in the preliminary groundwork.

Jacobs formerly was a marine installation engineer functioning as an advisor for the sales department for General Motors Detroit Diesel Engine Division. He is a graduate of University of Michigan, College of Engineering.

Campbell Makes Extended Tour of Venezuela

A. F. CAMPBELL

Arch F. Campbell, Tulsa, manager of petroleum-industry sales of the Detroit Diesel Division of General Motors, has been in Venezuela for the past 3 weeks, and is scheduled to return home soon. Campbell has visited all of the principal oil-producing areas, including Lake Maracaibo, Barcelona, Anaco, Caripito, and Jusepin.

Skinner Is Transferred to Denver as Tubular Salesman

Richard S. Skinner, sales representative for National Supply's Spang-Chalfant Division, has been transferred from the St. Louis office to Denver, as tubular salesman. After March 1, 1953, Denver will be headquarters for the company's oil-field division serving the Northwest.

Skinner joined the Spang-Chalfant Division following his graduation from University of California, Los Angeles, in 1937. Prior to coming to St. Louis

2 years ago, he served in sales capacities in both the Los Angeles and San Francisco offices.

Thornhill-Craver Names Tracy Word Sales Manager

TRACY WORD

Thornhill-Craver Co., Houston, has announced the appointment of Tracy T. Word, Jr., as manager of sales effective January 1.

Word is widely known in oil circles, particularly in the Gulf Coast area where he began his career in the oil-field-equipment manufacturing and supply business in 1934 in T. T. Word Supply Co. He has held sales and executive positions with several major equipment and supply firms.

William O. Merritt Joins Dozier Eastman & Co.

William O. Merritt, former sales manager of the Dynamometer Division of Clayton Manufacturing Co. of California, has joined Dozier Eastman & Co., Los Angeles industrial advertising agency, as an account executive. Merritt will help service the Fluor Corp. account.

Merritt was formerly associated with the Bear Manufacturing Co., Rock Island, Ill., for 10 years as public-relations and sales-promotion director. Prior to this he was a staff writer on the Rock Island Argus and midwest newspapers.

Merritt is a graduate of University of Iowa.

G & G Co. Will Distribute Carter Hydraulic Units

S. C. Carter Co., Los Angeles, manufacturers of the Carter long-stroke hydraulic pumping unit, has announced the appointment of G & G Machine & Equipment Co. as distributor for Oklahoma.

G & G, operated by Dick Gordon and Jack Gant, maintain complete machine-shop facilities, and will handle sales and service of the Carter units from its headquarters at Healdton, Okla., and Tulsa branch.

Continental Salesmen Meet at Lunkenheimer Plant

Sales representatives of The Continental Supply Co. pose with officials of The Lunkenheimer Co. during the distributor sales conference in Cincinnati. They are, front row: M. W. Pauly, R. O. Hambric, J. I. McQuiddy, R. Hortenstine, Jr., H. C. Beeson, W. T. Hays, B. L. Hindman, Van C. Moore, W. E. Young, D. A. Davis, R. L. Pebworth, T. H. Pyle, and H. H. Layritz. Back row: H. J. McMann, R. T. Klein, D. P. Davis, A. A. Dunaway, W. G. Sharp, J. R. Osteen, T. H. Fraser, N. D. Lane, W. R. Gottshall, E. R. Tieberman, and D. L. Smith.

Sales representatives of The Continental Supply Co., Dallas, met in Cincinnati recently for a 2-day review of new developments by The Lunkenheimer Co., pioneer valve manufacturer.

Continental Supply has branches in the principal petroleum centers in the Southwest and distributes Lunkenheimer valves, and other products, in that area.

The meeting was held in Lunkenheimer's new sales conference auditorium, completed recently on the third floor of the company's general office building in Cincinnati. Principal emphasis at the conference was placed on Lunkenheimer's revolutionary new nonslip handwheel.

W. M. Pauly and H. H. Layritz, Lunkenheimer divisional sales managers, were in charge of the conference. They were assisted by E. R. Tieberman, district manager of the Dallas office, and T. H. Pyle of the Cincinnati sales staff.

Ross Completes Extensive Trip for Baash-Ross

Kenneth S. Ross, export manager for Baash-Ross Tool Co., recently returned from an extensive business trip which included most of the major oil territories in Latin America.

Principal areas visited by Ross included East and West Venezuela, Columbia, Central America, and Mexico where he covered not only the main offices of the major oil companies, but also the more remote field operations frequently missed by representatives from the States.

Schutte and Koerting Elects New Officers

At a special January meeting of the stockholders of Schutte & Koerting Co., Cornwells Heights, Bucks County, Pennsylvania, the following new officers were elected: Mrs. Helen Koerting Fischer, formerly president, was named chairman of the board; U. W. Fischer, formerly vice president, was elected president; F. Boehm, formerly chief engineer, will be vice president in charge of engineering, and F. L. Siebold, formerly sales manager, was made vice president in charge of sales.

Whitmor Homebuilders Announces Three Changes

RENFROW

Russell Renfrow, Whitmor Homebuilders, Inc., has recently been elevated from the position of secretary to vice president in charge of production, according to an announcement made by Burl A. Johnson, vice president and general manager of the precut oil-field housing firm.

Other changes announced by Johnson included the appointment of H. E. Wicker as general superintendent; Oscar Oliver as superintendent in charge of the Midland, Tex., area; and Herbert Holloway as superintendent in charge of work in the Casper, Wyo., area.

Renfrow will headquarter at the Tulsa offices of Whitmor; Wicker will work out of Midland, and Holloway will work out of Casper.

(Continued on page 228)

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FOR SALE
D C 110-115 Volt Electric Motors, ½ to 10 H. P.—D C Generators with diesel drivers—D C Motor Starters and Magnetic Controls—D C Electric Bench Grinders—One Westinghouse Switchboard Panel. All in good working condition. Itemized list available. If interested contact: A. V. WINTHER, PASOTEX PIPE LINE COMPANY, P. O. BOX 1022, EL PASO, TEXAS.

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D18-S License N-80163. A beautiful silver trimmed in red, Corporation operated, Executive plane, completely equipped for instrument flying, including lots of extras, Lear L-2 Automatic Pilot, 80 gal. nose tank. This airplane has been flown by one pilot only. A real clean airplane. Write or wire **Al Buchanan Drilling Co., 2114 Alamo National Bldg., San Antonio, Texas.**

CASING

7" OD 26# Grade J55 Youngstown Range 3 with Hydril Speedite Threads, Streamline, 5300 feet, located Magnolia, Arkansas. Condition like new. Price OPS ceiling. Contact:

SAM SIEGEL
Ph. 4-6512, Shreveport, Louisiana.

PRESSURE VESSELS
Immediately Available

NEW LOW PRICES

8—10′ ID dia. x 40′ x 3" shell. Heads 3½". Test Pressure 900 psi. WP 600#.
5—10′ ID dia. x 40′ x 2½" shell. Heads 3". Test Pressure 750 psi. WP 500 psi.
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All used, good condition, seam to seam, welded construction. Built by A. O. Smith Corp. Located near Chicago, Ill. Prints, prices available on request.

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KINSLOW POWER & EQUIPMENT CO.
817 So. Boulder, Tulsa, Okla.

EQUIPMENT FOR SALE

1 OILWELL Steam Pump, 16¼ x 7¾ x 20". This pump is in excellent condition, may be seen at Makin Drilling Company Yard, Hobbs, New Mexico. Makin Drilling Company, Box 1628, Hobbs, New Mexico.

FOR SALE: In Oklahoma, 2 used 4½x10" Type K Worthington Duplex Power Pumps driven by RXB Hercules Power Units, mounted on steel base, been in Oil Pipe Line service. Price $2500.00 unit. Cities Service Pipe Line Company, Patridge, Bartlesville, Oklahoma.

ONE Cardwell "S" draw works with air clutches and WAKU Waukesha engine, 87′ jackknife mast with 6′ 6" substructure, 2 power slush pumps with engines. Wilson swabbing unit. QRC blowout preventers, 4" x 8" water pump. Rig complete with tools for workover and servicing. Stacked near Houston. $55,000.00. Norvell-Wilder Supply Company. Box 2178 Houston, Texas. Phone AT-3471.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

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Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

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4⅞" I.D. x 5¼" O.D.
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SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

FOR SALE in Tulsa 900 new 5½" OD 8 round thread API J55 casing couplings. All or any part $4.50 each F.O.B. Tulsa. Cities Service Oil, H. D. Patridge, Bartlesville, Oklahoma.

FOR SALE: In Oklahoma, Kansas, Texas, and New Mexico, a quantity of Angle Iron derricks. Complete detail and prices upon request. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

FOR SALE

2—WAK Waukesha engines complete with clutches. These engines are completely rebuilt and guaranteed for 90 days. Each **$3750.00**

Call or write

ROY BULLS, Phone 3-8307
310-B West Eleventh, Amarillo, Texas

USED EQUIPMENT FOR SALE

1—4′ x 6′ x 30′ Mogul substructure Manufactured by Wichita Engr. Co. Excellent condition **$1000.00**

7—Type LR 10" Series 900 Cameron Single Blowout preventer. Good condition **$400.00**

1—Set 2¼" x 72" B-J Weldless Elevator links **$250.00**

1—1942 GMC Water Truck with 2000 Gal. tank. Good rubber **$1000.00**

1—4′ Lee C. Moore derrick—Crown extension. Good condition **$500.00**

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11700′	5½" x 15½#
9000′	5½" x 17#
4600′	7" x 23#

J-55, Range 2, Short T & C, New, Seamless. Tested 3000 psi, **IMPORTED** CASING.

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2—80,000 bbl., 5—55,000 bbl., 1—25,000 bbl. and 10—10,000 bbl., 4—5,000 bbl., 22—1,250 bbl.

All cleaned out ready to cut down, located Wichita, Kansas, priced standing, cut down, or rebuilt your grade.

P.O. Box 1858 **W. C. BERRY** **Phone 3-6141, Tulsa, Okla.**

EQUIPMENT FOR SALE

FOR SALE: R. L. Dubbledrum Cardwell fully equipped. Oklahoma City, Oklahoma. Melrose 8-5103.

FOR SALE: 8—Shriver 42"x42" cast iron Filter Presses, Plate & Frame type, 18, 27, and 54 chambers, 1" cake; 15—Sperry 18"x18" cast iron Filter Presses, 11 chambers; 2—#12 Sweetland Filters for 36 leaves on 4" centers. Immediate shipment. Attractively priced. Consolidated Products Co., Inc., 17-20 Park Row, New York 38, N. Y. BArclay 7-0600.

FOR SALE: 40,000 ft. #1 3½" O.D. standard plain end line $0.55 per ft. 20,000 ft. 4" O.D. flues. Rogers Pipe and Supply Company, Phone 5-8850, Tulsa, Oklahoma.

GENERATING PLANT

1—Westinghouse AC 175 KW 3/60/440 Volts Generator "V" Belt Driven by LeRoi RXISV 12 Cylinder Gas Butane Engine Complete with Control Panel.

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CLOSED STEEL TANKS

25—8'6" Diam. 32'3" Height 13,600 Gallon capacity approx. weight ±9000.

2—10' Diam. 27' 2" Height 15,900 Gallon capacity approx. weight ±15,000.

Excellent condition, immediate delivery.

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Complete facilities. Can be used on location or dismantled and moved. Can be converted into gasoline plant. In Excellent Condition, used only a short time. Priced considerably below present replacement cost. Consists of following:

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30 million cubic feet per day
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Gas specific gravity—0.78
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H_2S Content outlet—0 GR/100CF
Solution—MEA 30%

Buildings and equipment in place:

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1—Reflux Accumulator.
2—Reflex Pumps.
1—Absorber.
1—4-unit Fin Fan Cooling Heat Exchanger.
1—Knock-out Drum.
1—Solution Heat Exchanger.
1—Reboiler.
1—Water Softener Unit and Pump.
2—24,000 lbs.-per-hour B & W gas fired Boilers, with steam turbines and speed reducers.
1—Sewage Disposal System.

This plant is complete and in good operating condition. For further data or appointment to inspect plant, contact:

Witco Chemical Company

1400 West Tenth Amarillo, Texas
Tel. 3-2855

EQUIPMENT FOR SALE

TWO FAILING 1500 heavy duty drills with 4½ x 6 pumps, automatic pulldown, and mounted on International trucks. Write P. O. Box 819, Longmont, Colorado. Phone 1333.

MOUNTED Rotary Drilling Rig. Dodge Truck, 1500 feet, Two Men Operate, Fast, Durable, Efficient, Roller Bearing. Money Maker. $5000. Box 106, Seminole, Oklahoma.

FOR SALE: One double drum Super-Mogul Wilson Spudder, powered by PA-100 International motor. $2500.00. Fox Well Servicing Company, Healdton, Oklahoma.

FOR SALE: Air compressors, one used 11x5x12 inch NCTB two stage Chicago Pneumatic, serial 27689, air compressor complete with 6 WAK engine. One used Ingersoll-Rand, type XOB Imperial compressor, 11x5x10 inch cylinders, complete with 145 Waukesha engine; also extra cylinders and other parts. Both above engines completely overhauled by Waukesha last two months. Both compressors in good condition. Price $5000.00 each. Located 17 miles southwest of Hebbronville, Texas, in Las Animas field. Chas. S. Sollars, owner, St. Anthony Hotel, San Antonio, Texas.

GAS BOOSTER PLANT FOR SALE

6 Type 80 Compressors, Electric Generators, Electric Motors, Water Pumps, Water Tanks, Boiler, Heat Exchanger, Pipe and Valves.
Plant Located in Webb County, Texas

ALFRED B. KERN COMPANY
223 Wright Bldg. Tulsa, Oklahoma

FOR SALE

5000 barrel Columbia bolted steel tank—dismantled. Strictly A-1. Located Wichita, Kansas.

GLICKMAN IRON & SUPPLY CO.
439 S. St. Francis Phone 2-6418
Wichita 2, Kansas

WORTHINGTON ENGINE

Model DDG, 450 HP, 360 RPM, 5 Cylinders, 4 cycle, 13¼" Bore x 17½" stroke. Under operation only 2 years. Rebuilt and guaranteed. Gas, Diesel or Dual, with or without.

Worthington Duplex Double Acting Pump, 3½"x18", 2,500# pressure, 72 strokes per min.

Above units in excellent condition.

MANUFACTURERS EQUIPMENT CO.
1878 E. 18th St., Cleveland, O.

FOR SALE

Bucyrus-Erie Spudder, Model 24L, purchased new in October, 1951, complete with all tools, house, water pump, water tank, light plant, etc.

(also)

Cyclone Drilling Machine, Model 46, purchased new in 1947, trailer mounted with lines.

Phone or Write:

MR. W. B. ARMSTRONG
P. O. Box 284
Wooster, Ohio
Phone: 2353

NEW STEEL PIPE

79,000 lin. ft. steel pipe, electric welded 24" diameter, 40 ft. lengths, 930 lb. test pressure, plain ends. Immediate delivery.

MISSISSIPPI VALLEY EQUIPMENT CO.
511 Locust St., Chestnut 4474, St. Louis 1, Mo.

EQUIPMENT FOR SALE

DIESEL Electric Generator Unit like new. Total 746 hours operating time—37½ KVA, 3 Phase, 60 Cycle, 220/440 Volts, 1800 RPM, Century Generator, direct connected to 72 H.P. Model 6DTG317 B/M #D3076, Buda Diesel. Located on our Ducommon Lease, Section 26, T6N., Crawford County, Illinois. Price $3,000.00. Red Head Oil Producing Company, Brilliant, Ohio.

GAS METERS FOR SALE. Westcott, Foxboro and Emco. Good condition. Geo. R. Milner, Box 124, Okmulgee, Oklahoma.

FOR SALE: One Barrel Type Ethyl Lead Plant, Hutex Oil & Refining Company, P. O. Box 2146, Houston, Texas.

CASING FOR SALE: 6000'—6¼" ID—6⅝" OD, 13#, Byers Gen. Wrought Iron—T&C. —14 Thds. New, prime, 20' Lgths. JULIUS M. FOGELMAN, 1649 Perkiomen Ave., Reading, Penna.

WELDED TANK of 10,000 and 15,000 bbl. capacity. Good condition, quick delivery and prompt erection. Atlas Tank & Steel Company, Tulsa, Oklahoma.

LINE PIPE

20,000 ft., 4½", 10.79 lb., plain end, Lap Weld line, cleaned, straightened and beveled for welding. Priced for quick sale. Edco Pipe & Supply. Phones 4-5970 and 9-8434, Box 151, Tulsa.

FOR SALE: Hydraulic pipe pulling equipment, 2 speed jacks, displacement pump, spiders, slips, etc. All mounted on 2 ton Dodge truck, all in first class condition and ready to work. Located at Artesia, New Mexico. A & B DRILLING COMPANY, Box 563, Artesia, New Mexico. Phone 1284.

FOR SALE: 2,500 ft. Rotary drilling rig with double section derrick, Cardwell draw works, 6¾ by 12 Gardner-Denver pump and other accessories. Phone Jackson 8-2897, or write Gene Graham Drilling Co., Box 5183, Okla. City.

1—BJ 200 ton 10¾" slip casing elevator with slips. 3—National 150 ton Ideal Swivels. 2—6" GS Swivels. 1 over and under National Crown Block, 4000' 6⅝" OD Drill Pipe with 7⅝" API regular tool joints. 1 set 2¾" x 96" BJ Weldless Links. E. A. Kelly, 1540 S. E. 29th Street, Box 861, Oklahoma City. Phone Jackson 5-6407.

FOR SALE: National Drilling Rig. Capacity 4,000 Feet. Good Condition. Buffalo Motor. Tools and Line not Included. Wolf's Head Oil Refining Co., Inc., P.O. Box 137, Oil City, Pennsylvania.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

Save Threads—Prevent Seizure!

ARMITE DRILL COLLAR & TOOL JOINT COMPOUND

ARMITE LABS., 6689 Bread St., Los Angeles 1, Calif.
Esch-Condit, Inc., Box 2071, Houston 11, Tex.

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WANTED: Three engine compound for Wilson Titan drawworks. Makin Drilling Company, Box 1628, Phone 3-3141, Hobbs New Mexico.

INTERESTED IN 1500 ft. 3½ inch external upset drill pipe, prefer 20 ft. lengths, fitted with tool joints; Byron Jackson breakout tongs; light weight rotary table with 12 in. opening; Mission slips; latch type elevators; drill hose; light duty draw works or rig; and other rotary accessories. Air mail complete list price and shipping point. Heater Well Co., Box 1128, Raleigh, N. C.

EQUIPMENT WANTED

WANT LIGHT portable rotary drill complete, 2500 to 3000 ft. depth. Prefer truck mounted. T. R. Davis, 700 Mosley Street, Vidalia, Georgia.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale? Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

HELP WANTED

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

SEISMIC PERSONNEL needed for United States and Canada by well known and expanding contract geophysical company. Address Box E-863, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

FOREIGN SERVICE

The Arabian-American Oil Company has immediate openings for:

SENIOR PETROLEUM ENGINEER

Proficient in Math, with extensive experience in oil and gas reservoir engineering and production research. Duties will include the collection, analysis, and evaluation of data pertaining to the characteristics, operation, and performance of reservoirs and producing wells.

ENGINEER: RESERVOIR FLUIDS EVALUATION

With degree in Chemical Engineering or Industrial Chemistry plus 5 years experience in Petroleum Production Engineering, of which a minimum of 2 years has been devoted to the study of reservoir fluid behavior. Duties include sub-surface and surface sampling; operation of PVT laboratory for experimental and theoretical studies; and operation of gas and oil analysis laboratory.

Write giving full particulars of personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR, BOX OG-3

Arabian-American Oil Company

505 Park Avenue

New York 22, N. Y.

HELP WANTED

PETROLEUM Engineers, graduates, minimum three years field experience, one year contract, foreign work. Prefer single men experienced in drilling operations and mud control. In replying give education, experience, and salary expected. Address Box G-298, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST wanted to headquarter in Denver with independent oil company. Must have well sitting, sample examination and mapping experience, and at least two years experience in Rocky Mountain Area. Reply will be kept confidential. Box G-264, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST with Canadian or Rocky Mountain experience wanted by independent oil company to headquarter in Calgary. Replies will be kept confidential. Box G-265, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN with minimum of 5 years land experience to serve as district man in Gulf Coast area for operating company. Replies confidential. Box G-301, The Oil and Gas Journal, Tulsa, Oklahoma.

DRILLERS wanted 12" hole Savanna, Ill. $2.00 per hour. Milaeger Well Drilling Co., 4630 W. Burleigh, Ph. Uptown 3-8454, Milwaukee, Wis.

CREDIT manager for independent oil refiner headquartered in Texas. Prefer man 30 to 35 years old with considerable actual experience in handling credits and collections for petroleum products where substantial sums are involved. Answer Box G-321, The Oil and Gas Journal, Tulsa, Oklahoma.

DIVISION Geologist with Louisiana Gulf Coast regional subsurface experience required by sound, substantial company in New Orleans. In reply, please state salary expected and give details of education and experience. Replies confidential. Box G-313, The Oil and Gas Journal, Tulsa Oklahoma.

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 434 Frick Bldg., Pittsburgh 19, Pa.

ASSISTANT CHIEF ENGINEER

Age 30-45. Graduate and registered engineer. Experienced in gas pipe line design and construction. Office in Houston. Mail reply giving qualifications.

Box G-292, The Oil and Gas Journal, Tulsa, Oklahoma

MAKE YOUR CAREER A RESEARCHER AND TEACHER IN PETROLEUM SCIENCES

On September 1, 1953, two persons will be added to the regular staff of the School of Petroleum Engineering, University of Oklahoma. One position is for a junior member of the faculty who has received a Ph.D. or Sc.D. in Petroleum, Chemical, Mechanical Engineering or a Ph.D. in Chemistry or Physics. The person selected for this position will teach undergraduate and graduate courses and direct some research.

The second position is for a senior member who has a Ph.D. or Sc.D. degree and two or more years of experience in petroleum production or related work. The person selected for this position will direct the research program of the School of Petroleum Engineering as well as teach a few advanced courses.

The basis of selection of a person for each position will be on over-all qualifications. Faculty members are permitted to do some consulting work and they are urged to participate in remunerative research through the University of Oklahoma Research Institute.

For additional information and application forms write to:

Prof. H. W. Benischek, Chairman
School of Petroleum Engineering
The University of Oklahoma
Norman, Oklahoma

HELP WANTED

CHEMICAL ENGINEER for design and/or field installation of gas process equip. At least 2 years exp. in plant process or construction. Leading S. W. Manufacturer. Box G-270, The Oil and Gas Journal, Tulsa, Oklahoma.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

SITUATIONS WANTED

LANDMAN trainee (have some experience) or office assistant, with independent. MA degree Economics. Business law, statistics. Own car. Any hours any place. $350 monthly. Trial basis fine. Reply Box G-307, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Engineer, 7 years major company experience, Gulf Coast and West Texas, production, drilling, and reservoir analysis. Employed, married, age 31. Desires position with independent. Box G-309, The Oil and Gas Journal, Tulsa, Oklahoma.

BOOKKEEPER-ACCOUNTANT: Small Oil Company experience. Complete books, financial statements, lease and land records, taxes, partnership operations. Full time or consider half days. Phone 2-4048, Tulsa.

WITH five years experience as Oil Scout and Leaseman in the Rocky Mountain area, desire to obtain retainer on a commission or salary basis to represent investors in Federal and State lands through Rocky Mountain area. Have access to immediate information on new discoveries and can acquire land for you in land plays that invariably develop, and that are geologically favorable. References furnished. Box G-296, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED PETROLEUM GEOLOGIST (Gulf Coast, West Texas, Mid-Continent, Rocky Mountains). 9 years major, 4 years independent. Specialist regional and local subsurface problems. Location open. Box G-299, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628, Ph. No. 3-3141, Hobbs, New Mexico.

PETROLEUM GEOLOGIST, four years subsurface, surface, 34, married, desires employment with independent oil company. Box G-322, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT ENGINEER

Experienced oil country Equipment Engineer with Sales, Maintenance, and Manufacturing background plus high Government rating as Industrial Specialist, desires connection with established Company as Liaison Engineer, Product Analyst, Sales Engineer or general factory representation. Presently employed as Industrial Engineer. Box G-315, The Oil and Gas Journal, Tulsa, Oklahoma.

ASPHALT CHEMIST, degree, 13 years' experience supervising development and control. Thorough knowledge development, production, and marketing industrial asphalts. Excellent references. Box G-319, The Oil and Gas Journal, Tulsa, Oklahoma.

REGISTERED engineer seeks a responsible position with an established organization. Background of over 25 years experience in the oil refinery and petro-chemical field. Have proven experience in organizing efficient engineering departments in all their phases. Present earnings $15,000 per year. Box G-316, The Oil and Gas Journal, Tulsa, Oklahoma.

EXECUTIVE SECRETARY: Ten years Major Oil and Legal Experience. Age 35. Present position Secretary to Refining Division Manager, Major Oil Company. Immediate family illness necessitates return to Tulsa. Box G-314, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

DESIGN ENGINEER: 45 years old—internationally known—16 years office and field charge petroleum plants, design and construction—12 years with present top engineering and construction firm. Will consider offers with major oil company. Directing above category. Box G-318, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column? Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

WANTED—Farms, Oil Leases, Royalties, Cass County, Texas, White County, Illinois. Address: W. Rothenhoefer, 1444 Kingsland, St. Louis 14, Mo.

WILL Buy Leases or Royalties on order in Texas, Oklahoma, for individuals, corporations. M. H. Halff, 210 Empire Bank Building, Dallas.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

LEASES For Sale over 1600 acres East Lamar County, Texas. 10 years commercial leases, $1.00 rental, surrounded by Major Companies will sell cheap. Also over 2000 acres for drilling block located in Lamar & Red River Counties, Texas. Write Box 22, Greenville, Texas.

3000 ACRES-2800 acres GRAY COUNTY, TEXAS, Semi-proven oil and gas 3000' Small cash bonus and little override. 5 year commercial lease $1.00 rentals. Combest Royalty Co., Amarillo, Texas.

LEASE FOR SALE. 260 acres in Ashland County, Ohio, with 28 producing Oil & Gas Wells, Berea Sand—510 ft. Deep. Only a small portion developed, more acreage is available. For further information write, P. O. Box #188, Chippewa Lake, Ohio.

SOUTH LOUISIANA & GULF COAST GEOLOGISTS

Ex-Company Landman representing substantial interests would like to hear from geologists with seismic or subsurface prospects that merit drilling. Excellent references. All replies strictly confidential. Box G-280, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL LEASES EXTRAORDINARY. Vast structure 8x15 miles recently discovered and mapped in Southern New Mexico. Some preliminary development indicates huge body of high grade oil 3000 to 4000 ft. Will give 2500 acres free for a well, an additional 2500 acres can be acquired for $2 or ½ interest for $1 per acre. Hurry. Better wire for particulars. E. L. Stratton, Licensed Security Dealer, Pecos, Texas.

I OFFER oil and gas leases in Pecos County, also mineral rights. For complete details write to John Stouppas, 175 E. Long St., Columbus, Ohio.

DALLAM COUNTY, TEXAS: 8000 acres solid block one owner. ½ County leased to Major Companies. $1.25 bonus, $1.00 rentals. 10 year commercial lease. Combest Royalty Company, Amarillo, Texas.

HAVE you drilled on the best looking structures and missed? If so, then let me stake you a location on your leases or farm out some of mine to you. Box G-317, The Oil and Gas Journal, Tulsa, Oklahoma.

AM offering 2000 acres of mineral rights perpetual full participating under 50 quarter sections scattered in Northwestern Kansas Counties. Will sell all or one-half at $10.00 an acre. Address 409 Commercial Bank Bldg., Muskogee, Oklahoma.

LEASES ROYALTIES

Producing and Nonproducing

Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY

6635 Delmar Ave., St. Louis 5, Mo.

LEASE AND DRILLING BLOCKS

DRILLING Deals. See A. L. Bowles, Rollow Bldg., Ada, Okla.

FOR SALE: 320 acre state oil and gas lease in Lea County, New Mexico. Box G-320, The Oil and Gas Journal, Tulsa, Oklahoma.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

ROYALTIES

PRODUCING ROYALTY and overrides for sale. Wire-write-call for particulars. JACK EAGLE, 706 City Natl. Bldg., Okla. City, Okla. REgent 6-7027.

OIL ROYALTIES

Will sell some of my Weld County, Colo., personally owned perpetual royalties under close in leases. G. J. Stumpff, Irvine Eng. Co., 117 N. 2nd. Ave., Phoenix, Ariz.

QUICK CASH: Producing royalties, Overrides or Production . . . no delay. Phone 72-4533, Robert L. Kinkaid . . . P.O. Box 26, Tulsa, Oklahoma.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

ROYALTIES WANTED

Producing Royalties
High Grade Only
Send Full Particulars
Address

C. C. HARMON

719 World Bldg., Tulsa, Okla.
P.O. Box 2151

PRODUCTION WANTED

WANT producing wells in paraffin or heavy oil areas where heating bottom hole fluids with Parelex Electric Heater could increase production. Parelex Corporation, Box 552, Houston 1, Texas.

Transact Your

OIL BUSINESS

With An Experienced Contact

On GROUND FLOOR Basis of

Oil Investments

Drilling Proposals

A. S. BERRY

P.O. Box 1303 322 Wright Bldg.
Phone 5-5402, Tulsa, Okla.

BUSINESS OPPORTUNITIES

MANUFACTURERS AGENT, well established in drilling and production fields, wants additional related lines to represent in Mid-Continent area; owns warehouse. Write John R. Riley & Associates, 525 S. E. 29th St., Oklahoma City, Oklahoma.

SERVICES

WELL LOCATIONS & Land Surveys, Henry George White, Reg. Engr. #734 Court House Phone 427, Home 857, Chickasha, Oklahoma.

RANCHES AND FARM LANDS

FOR SALE: JACKSON HOLE, WYOMING, CATTLE & GUEST RANCH. Combination purebred cattle and guest ranch. Magnificent scenic setting. Three miles of large river through ranch. Good fishing and elk hunting. 1000 fertile acres highly developed. Will carry 200 cows and produce all feed year round. Two modern residences, all guest cabins luxury modern. Will sell equipped, furnished and stocked. Pictures, full information to responsible persons. Box G-297, The Oil and Gas Journal, Tulsa, Oklahoma.

REAL ESTATE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

EQUIPMENT MEN

(Continued from page 224)

National Supply Announces New Canadian Location

The National Supply Co., Ltd., has announced the new location of its division offices in the F. W. Clark Building, 709 Eighth Avenue West, Calgary, Alta., effective January 1.

American Locomotive Names New Sales Appointments

Appointments to new sales posts were announced recently by American Locomotive Co.

W. S. Morris, executive vice president, announced appointments in the sales organization for the Alco Products Division, serving the petroleum, chemical and power industries. A. T. Lawrance was named regional manager in charge of sales offices located at Houston, Tulsa, Los Angeles, and Beaumont, Tex. These duties are in addition to his present assignment as plant manager of the Beaumont Iron Works, an Alco subsidiary. Paul W. Geisler was named regional manager in charge of Alco products sales work at district offices located at New York, Dunkirk, N. Y., and Chicago. Walter E. Beline replaced Geisler as district manager for the division at New York. L. W. Eger was appointed manager, sales-service, for the Alco products division at Dunkirk.

Owings-Sharpe to Produce Variety of Plastic Pipe

Owings-Sharpe, Inc., of Magnolia, Ark., will soon begin the production of plastic pipe for a wide variety of uses. A new plant is now under construction, and operations are scheduled to begin in March.

Jay W. Owings, president of the new corporation, is well known to petroleum operators and pipe-line companies through his association with Youngstown Sheet & Tube Co. where he served as assistant general manager of sales until his recent resignation.

Leslie P. Sharpe, vice president, was formerly associated with Ohio Water Service Co. as vice president, and has

a wide background in the utility field, particularly in engineering and construction work.

Owings and Sharpe will supervise the production of OS plastic pipe, serving the petroleum, utility, and industrial fields.

Eggelhof Engineers Moves Into New Dallas Offices

Eggelhof Engineers, Inc., has recently moved into new, enlarged offices in Dallas. The move is part of a continuing company expansion program.

Other branches of Eggelhof are located in Tulsa, Shreveport, New Orleans, Houston, Corpus Christi, San Antonio, Lubbock, Fort Worth, and Little Rock.

ADVERTISERS IN THIS ISSUE

Air Reduction Company, Inc. 44
Allis-Chalmers Mfg. Co. (Tractor Division) 29
Alten Foundry & Machine Works 230
Aluminum Co. of America 60, 61
American Brass Co., The 51
American Car and Foundry Company 195
American Chain Division of American Chain & Cable Co., Inc. 148
American Locomotive Company 43
American Recording Chart Co. 208
Anchor Petroleum Company 30
Anderson Co., V. D. 166
Anesite Company 209
Angio-Iranian Oil Company, Limited 140
Appleton Electric Company 78
Atlantic Refining Company, The 40, 41
B and W, Inc. 197
Baker Oil Tools, Inc. 88
Barrett Division of Allied Chemical & Dye Corp. 65
Beaumont Iron Works Co., Subsidiary of American Locomotive Co. 84
Bechtel Corporation 21
Bemis Bro. Bag Co. 211
Bendix Aviation Corporation 55
Bethlehem Supply Co. 107
Black, Sivalls & Bryson, Inc. 36
Bonney Forge & Tool Works 63
Bovaird Supply Co., The 34
Brewster Company, Inc., The 19, 20
Brown Fintube Co., The 155
Burgess-Manning Company 62
Butler Manufacturing Co. 59
Byron Jackson Co. 161
Carbide & Carbon Chemicals Company A Division of Union Carbide and Carbon Corporation 58
Carpenter Steel Company, The 10
Catawissa Valve & Fitting Co. 190
Caterpillar Tractor Co. 9
Chain Belt Co. 8
Charles Machine Works 192
Chicago & Southern Air Lines 216
Christensen Diamond Products Co. 152
Classified Advertising 225, 226, 227, 228
Cleaner Pipelines Co. 189
Colorado Fuel and Iron Corp., Wickwire Spencer Steel Division 179
Cooper-Bessemer Corp., The 132, 133
Crane Co. 5
Crescent Plastics, Inc. 156
Crose Manufacturing Co., Inc., M. J. 79
Dean Brothers Pumps, Inc. 174
Desco Service Co. 176
Deublin Company 147
Dia-Log Company, The 63
Diamond Alkali Company 35
Dolge 192
Dollinger Corporation 12
Dominion Bridge Company, Limited 38
Dowell Incorporated 185
Dresser Industries, Inc. 163
Dresser Manufacturing Division 163
Drilling & Service, Inc. 217
Eaton Manufacturing Company, Axle Div. 53
Empire Trust Company 201
Enardo Manufacturing Co. 164
Ethyl Corporation 71, 72
Farrel-Birmingham Co., Inc. 14
First National Bank & Trust Co. of Tulsa, The 192
First National Bank of Shreveport, The 174
Fisher Research Lab., Inc. 196
Flint Steel Corporation 187
Fluor Corporation, Ltd., The 30
Ford Alexander Corporation, The 83
Foster Company, L. B. 192
Foxboro Company, The 22
Gates Rubber Co., The 11
Goodrich Company, B. F. 3
Gott Mfg. Co., H. P. 201
Grancell, I. H. 194
Guiberson Corporation 183
Haering & Co., Inc., D. W. 149
Halliburton Oil Well Cementing Co. 23, 67
Homestead Valve Manufacturing Co. 16
Hudson Engineering Corporation 145, 146
Hufford Machine Works, Inc. 170
Hughes Tool Co. Back Cover
Inferno Co., The 194, 205
Insley Manufacturing Corporation 190
Jensen Brothers Mfg. Co. 201
Johns-Manville Corporation 52
Johnston Testers, Inc. 39
Jones & Laughlin Steel Corporation, Supply Division 24, 25
Jones Company, The S. M. 168
Kaiser Steel Corporation 66
Kewanee-Ross Corporation 64
Kinzbach Tool Co., Inc. 201
Lane-Wells Company Inside Front Cover
Layne & Bowler, Inc. 13
Lehmann Machine Company 17
Leschen & Sons Rope Co., A. 136, 137
Link-Belt Speeder Corporation 6
Maintenance Engineering Corp. 42
Maloney-Crawford Tank & Mfg. Co. 73
Manning, Maxwell & Moore, Inc. 28
Mark & Company, Clayton 85
Mayes-Bevan Company 198
McCord Corporation 187
McCullough Tool Company 139
McFarland Engineering & Pump Co. 212
Medical Supply Company 32, 33
Minnesota Mining & Mfg. Co. 45
Mission Mfg. Company 213, 214
Mixing Equipment Co., Inc. 172
Moore Corporation, Lee C. 142, 143
Murphy, Frank W. 166
National Airoil Burner Co., The 188
National Bank of Tulsa 15
National Supply Co., The 56, 57
National Tank Company 230
Norris Manufacturer, Inc., W. C. 98
Oakite Products, Inc. 174
Ohio Injector Company 18
Oil and Gas Journal, The 151
Oil Equipment Mfg. Co., Inc. 138
Oil Well Mfg. Corp. 206
Oil Well Supply Co. 4
Pacific Car and Foundry Company 82
Pacific Coast Borax Co. 167
Parelex Corporation 196
Parkersburg Rig & Reel Co. 76
Peerless Pump Division of Food Machinery & Chemical Corporation 115
Pelton Water Wheel Co. 111
Penberthy Injector Co. 2
Perforating Guns Atlas Corporation 202
Petro-Chem Development Co., Inc. 186
Petroleum Electric Power Assn. 75
Petroleum Rectifying Company 26
Phoenix Manufacturing Company 166
Pioneer Rubber Co., The 188
Pittsburgh Coke & Chemical Co. 77
Powell Co., The Wm. 50
Rasmussen Mfg. Co. 170
Ratigan, Inc., J. P. 74
Reading-Pratt & Cady Division of American Chain & Cable Co. 207
Rector Well Equipment Co., Inc. 196
Reed Roller Bit Company 129
Republic Steel Corporation 37
Richardson-Allen Corporation 150
Ridge Tool Company, The 191
Rockwell Manufacturing Company 47
Rockwood Sprinkler Company 27
Russell & Stoll Company, Inc. 157
S&R Tool & Supply Co. 151
Scott-Rice Company 196
Service Foundry, A Division of Avondale Marine Ways, Inc. 151
Smith Corporation, A. O. 70, 209
Southern Mill & Mfg. Co. 31
Spang & Co. 215
Spartan Aircraft Company 153
Sperry-Sun Well Surveying Co. 170
Standard Oil Co. of California 158
Standco Brake Lining Co. 196
Steel Forgings, Inc. 188
Taylor Forge & Pipe Works 180
Thompson Tool Co. 165
Tuthill Pump Company 81
Twin Disc Clutch Co. 204
Ultra Violet Products, Inc. 192
Union Carbide and Carbon Corporation, Carbide and Carbon Chemicals Company 58
Union Wire Rope Corporation 197
U. S. Steel Corp. Subsidiaries 4
Visco Products Co., Inc. 103
Voss Co., Inc., J. H. H. 176
Warner Lewis Company 176
Warren Petroleum Corporation Front Cover
Waukesha Motor Company 48
Web Wilson Oil Tools, Inc. 7
Well Equipment Mfg. Corp. 210
Western Company 80
Westinghouse Electric Corp. 68, 69
Wheland Company, The 54
Wichita Falls Foundry & Machine Co., Inc. 141
Wickwire Spencer Steel Division, Colorado Fuel and Iron Corp. 179
Williams Brothers 189
Williamson, Inc., T. D. 222
Wisconsin Motor Corporation 205
Wolverine Tube Division of Calumet & Hecla, Inc. 48, 49
Wood's Sons Co., T. B. 188
Youngstown Sheet and Tube Company Inside Back Cover

Central Area

(Continued from page 217)

Gemmer, NW SE NW 13-15n-1w, dry, TD 2,000 ft.

Clark County: E. J. Gwinn 1 Connelk, NE NW SW 11-11n-14w, dry, TD 500 ft.

Clay County: Don Traders 1 Tolliver-Common, SE SE NW 4-4n-7e, dry, TD 3,039 ft.

N. V. Duncan 1 Halterman, NE SE SE 7-2n-7e, dry, TD 3,196 ft.

Wayne County: L. G. Ewart 1 Young-Mount Erie, NW SE NW 32-2n-9e, dry, TD 3,168 ft.

White County, T. G. Glass 1 Garrison, N½ NW SE 1-7s-10e, dry, TD 1,074 ft.

INDIANA WILDCAT FAILURE

Vigo County: T & H Corp. 1 Duvall-Keasbey, SE NE SW 16-10n-8w, dry, TD 1,935 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Ohio County: Wilson & Vail 1 Rawson, EL SE SW NW 1-L-31, dry, TD 950 ft.

V. T. Drilling Co. 1 Johnson, SL NW NE SW 17-M-34, dry, TD 841 ft.

Union County: Taylor Drilling Co. 2 Pride, NE SE NE NW 6-M-20, dry, TD 480 ft.

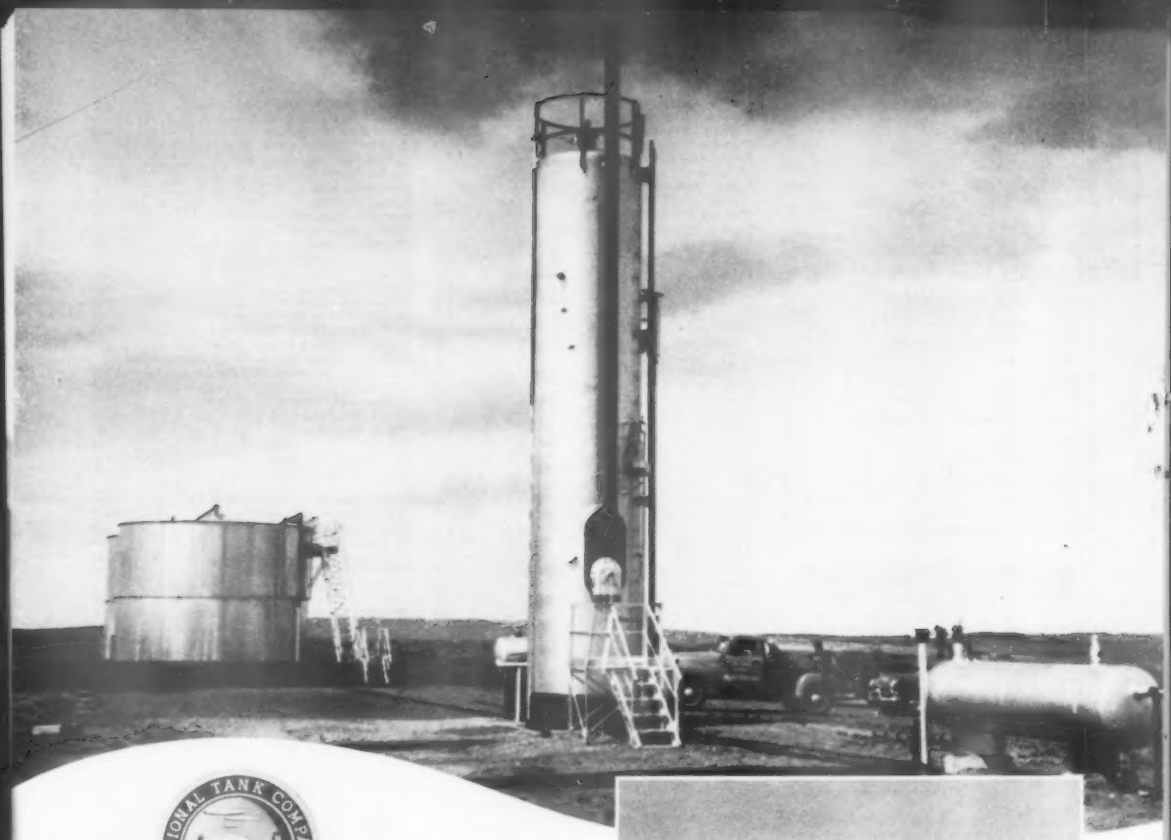
MICHIGAN WILDCAT FAILURES

Allegan County, Fillmore Township: Charles W. Cook 1 Kooiker, NE NW SE 36-4n-15w, Traverse 1,558 ft., dry, TD 1,568 ft.

Gratiot County, Arcadia Township: William J. Morriss 1 Fisher, NW NE SE 25-11n-3w, Marshall 999 ft., dry, TD 1,002 ft.

Montcalm County, Crystal Township: Columbia Oil & Gas Co. 1 McCracken, NE SE NW 31-10n-5w, Dundee 3,125 ft., dry, TD 3,186 ft.

Van Buren County, Arlington Township: Norman L. Stevens 1 Peet, SW SW SW 9-2s-15w, Traverse 1,116 ft., dry, TD 1,121 ft.



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One of the newer and most active areas in America is now well on its road to complete definition as a great American Oil Field.

National customers have found National ready, able and willing, as usual, with a large stock of supplies and top flight service to care for their every need! National again expresses its pleasure in its ability to perform these services and appreciates the confidence expressed by those customers.

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2-2-53

A Program for 30 million new Americans

LISTEN to the voices of 30 million new Americans. They are answering the pessimists who say we are threatened with depression because we can't keep our farms and factories busy.

Let these pessimists read the future in the census returns. There is a tremendous upsurge in our population. Last year nearly 4 million babies were born. By 1960 we shall total 170 million people--30 million more than when war ended in 1945. This adds to our domestic market more people than there are in Canada and Australia combined.

Providing for these 30 million new Americans can keep our production machinery going at capacity. They call for new hospitals, schools and churches. Larger families need bigger houses to replace post-war houses that are too small now. More and bigger families need improved home equipment and more new automobiles. In short, to maintain and improve living standards for our children, we must work harder than ever before. To supply the needs of our 1960 population, including adequate national defense, it is estimated that the productivity of the individual worker must increase at least 30%, with additional investment of over 200 billion dollars in capital facilities.

There should be no room in this picture for depression. But we must have economy in government, elimination of waste and extravagance and a reduction of taxes and public debt. If we encourage private incentive, thrift and investment, we can bring about the greatest advance in health, wealth and happiness that America has ever known.

QUALITY YOUNGSTOWN SERVICE

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

RAILROAD TRACK SPIKES - CONDUIT - HOT AND COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RODS - SHEETS - PLATES.

Here's why you don't replace tool joints when they are Hughes Flash-Weld

**Drill stems are deliberately failed in the Hughes Laboratory in evaluating field performance of pipe-to-tool-joint connections. Pioneered by Hughes, these tests simulate conditions that cause drill stems to fail in the field.*

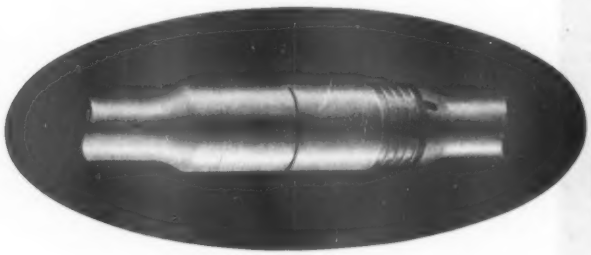
1 HUGHES Flash-Weld Joints are made to last the life of your drill stem . . . eliminating costly tool joint replacements.

2 HUGHES hard-faced Flash-Weld Tool Joints withstand the wear of abrasive formations—and can be *safely* rehard-faced in the field to meet extreme abrasive conditions.

3 HUGHES Flash-Weld Joints have been proved on more than 25,000,000 feet of drill pipe and by 15 years of superior field service.*

4 HUGHES Flash-Weld drill stem is the most dependable drill stem you can run in your well.

5 Cost records show that the cost per foot of hole drilled is lower with HUGHES Flash-Weld drill stem.



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